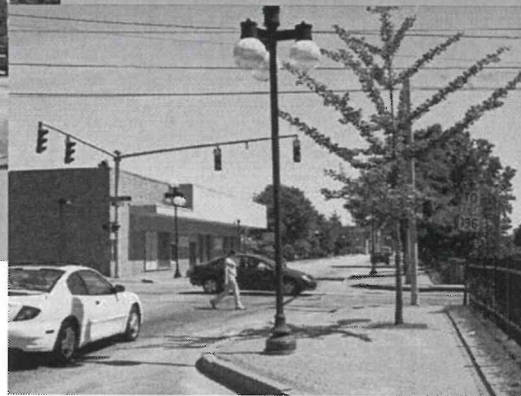


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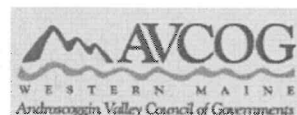
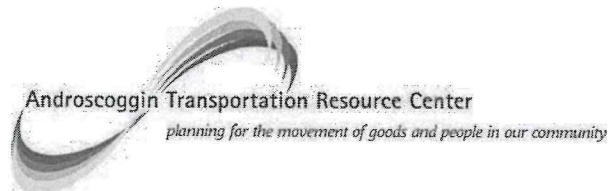
Lewiston/Auburn Downtown Central Business District Traffic Study



Submitted By:



In Association with:



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Lewiston/Auburn Downtown Central Business District Traffic Study

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Appendix

- June 2005 Public Meeting Attendance Lists
- June 2005 Public Meeting Issues Summary Figure and Text
- April 2007 Public Meeting Summaries

Traffic Counting Technical Memorandum

A Technical Memorandum outlining data collection and results was issued in December 2005. Please consult this document for detailed traffic volume data. A brief summary of the data collection effort is given in this report.

Auburn:

- Main Street / Academy Street

Lewiston:

- Lincoln Street / Chestnut Street
- Canal Street / Chestnut Street
- Lisbon Street / Chestnut Street
- Lincoln Street / Cedar Street

For 2025, poor operations are expected to continue at previous locations and develop at new locations:

Auburn:

- Union Street Bypass / Turner Street / Center Street
- Broad Street / Riverside Drive
- Main Street / Academy Street (new)

Lewiston:

- Lincoln Street / Chestnut Street (new)
- Lincoln Street / Cedar Street (new)

Poor turning movements are expected at two locations in Auburn and three locations in Lewiston.

Congested locations as indicated by simulation analysis show similar results. Only two locations in 2005 indicate delay of 80 seconds or greater per vehicle, while 18 locations exceed this threshold for the 2025 forecast traffic.

Conceptual Improvements

Court Street / Main Street corridor – Coordination, actuation, and optimization of this corridor shows significant benefits when analyzed. Generally, the current signal system is designed for this type of control, but would need upgrades, programming, and on-going maintenance to achieve this goal. Overall improvement in the study area as a result of the corridor synchronization option indicates a decrease in delay per vehicle from 518 seconds to 309 seconds based on simulation.

Figures E.1 and E.2 show specific improvements throughout the study area. These can be broken down into different categories:

- Pedestrian Safety Improvements: Better and new crosswalks, sidewalks, signal timing, remove channelized free right turns
- Vehicular Safety: Add protected left turns and increase clearance intervals

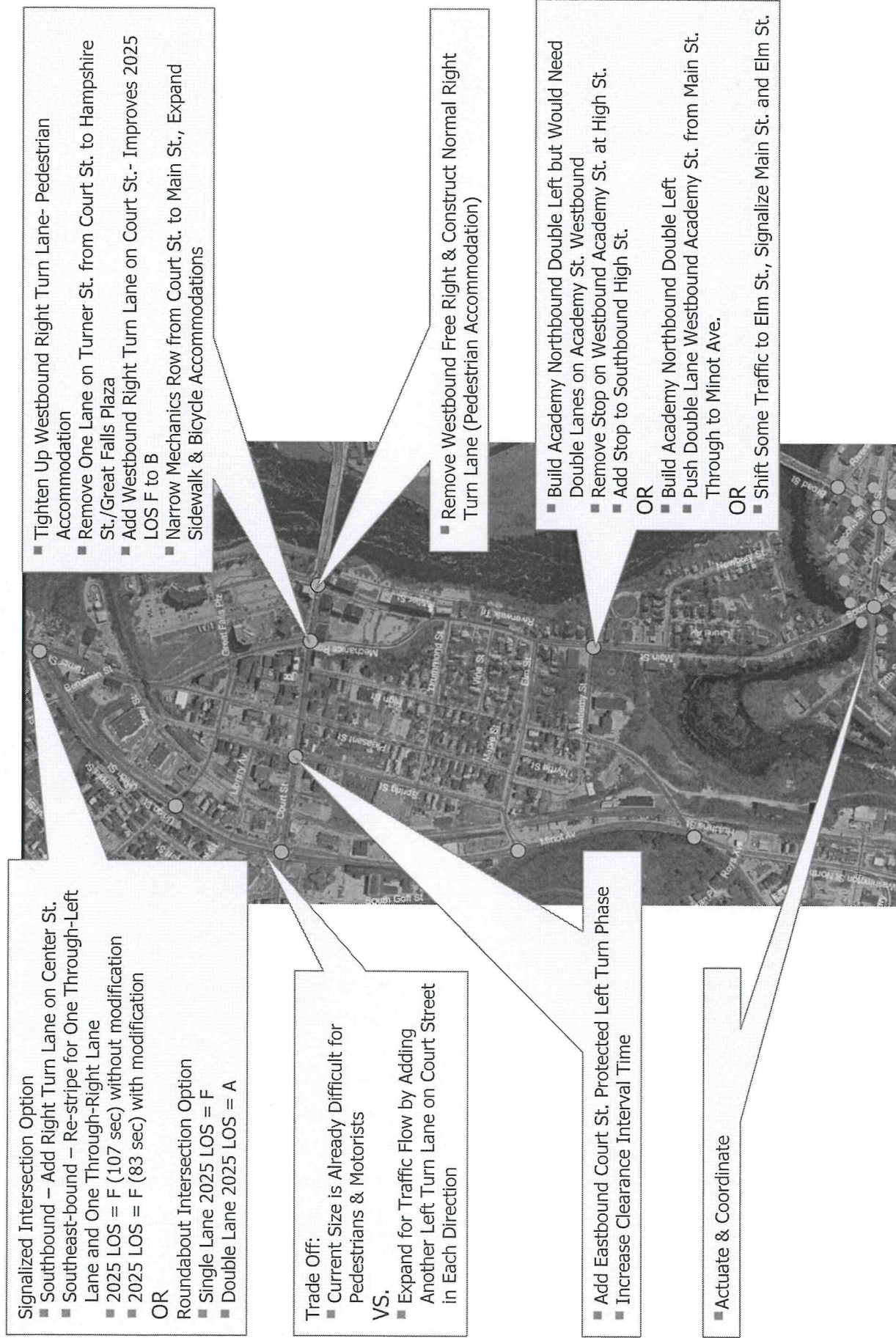


Figure E1: Auburn Conceptual Improvements

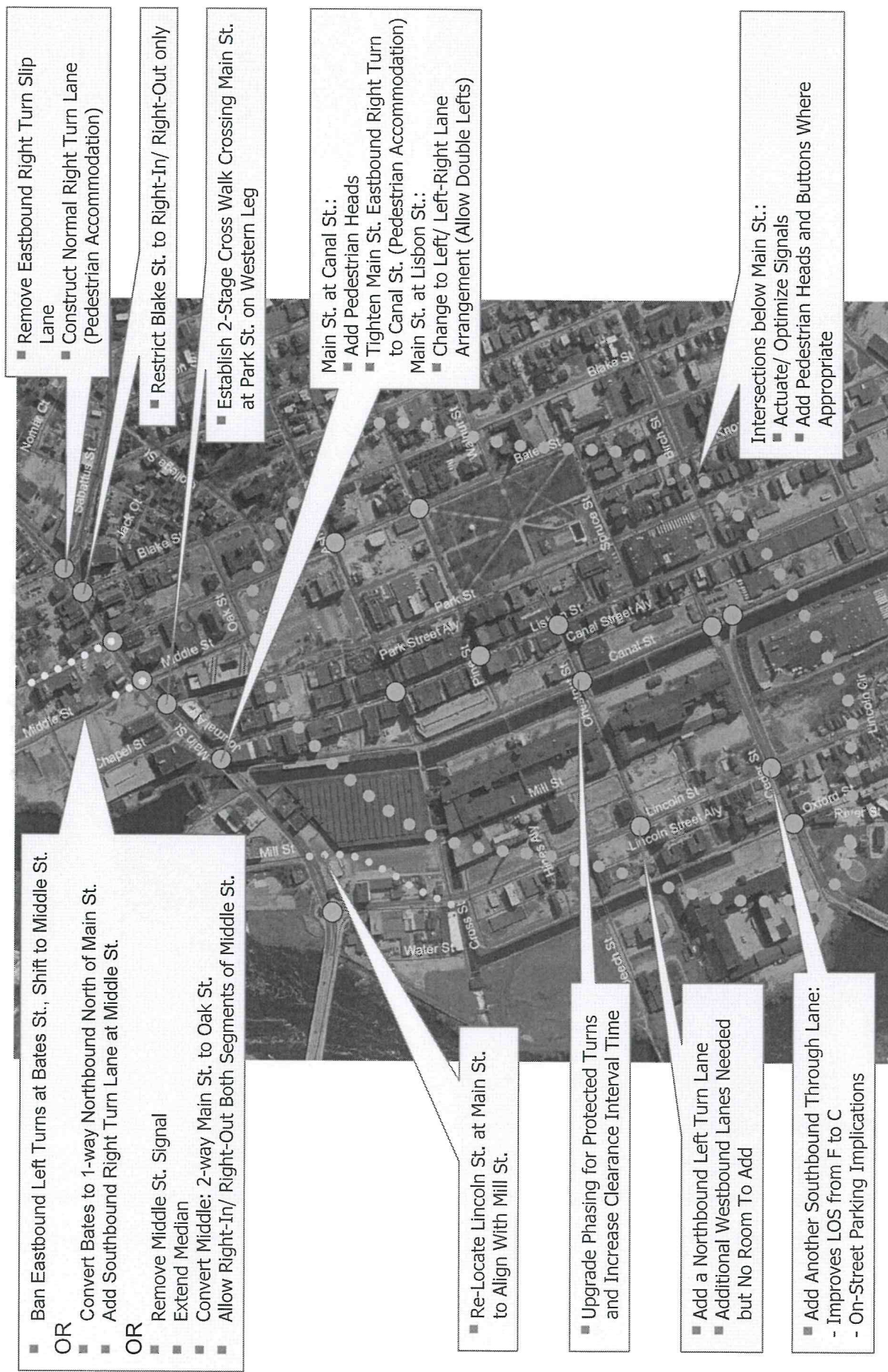


Figure E2: Lewiston Conceptual Improvements

1. Introduction

The Androscoggin Transportation Resource Center (ATRC) and the Cities of Lewiston and Auburn have initiated a study of the downtown central business district areas of both cities. The purpose of this study is to build a downtown transportation and circulation model to measure current roadway performance and forecast impacts associated with transportation system changes such as additional turning lanes, traffic control changes, and conversion of street directions. The connections between the Twin Cities are limited to three river crossings. The rapid economic development that is occurring, combined with the limited connections, complicates traffic patterns. Improving traffic flow in the downtowns should enhance developments planned for those areas. With the exception of roadways located immediately within the downtown areas and the intersection of Union Street Bypass / Turner Street / Center Street in Auburn, none of the roadways in the study area are consistently experiencing traffic congestion. However, on-going development and re-development in both downtown areas and the planned addition of two Maine Turnpike Interchanges could dramatically affect trip generation and access to the Downtowns, thereby affecting downtown congestion levels as well.

2. Existing Conditions

2.1. Study Area Intersections

For the purposes of this study the Central Business District (CBD) is defined as follows:

- Lewiston – The area bounded by Russell Street to the north, East Avenue to the east, and the Androscoggin River to the west and south
- Auburn – the area bounded by Center Street/Union Street By-Pass to the north, Union Street By-Pass/Minot Avenue to the west, High Street/Academy Street and Route 136/Riverside Drive intersection to the south and the Androscoggin River

The study area intersections are shown in **Figure 2.1**. This section describes the 28 major signalized intersections and one unsignalized intersection chosen for detailed review as part of this study.

Auburn

- Minot Avenue/High Street – A “T” intersection – Minot Avenue is two lanes each direction, High Street is one lane each direction plus a westbound left turn lane.
- Minot Avenue/Elm Street – A “T” intersection – Minot Avenue is two lanes each direction, Elm Street is one lane each direction plus a westbound right turn lane.
- Minot Avenue/Union Street By-Pass/Court Street – Minot Avenue, Union Street By-Pass, and Court Street are two lanes in each direction. At the intersection, both Minot Avenue and Union Street By-Pass have a left turn lane, two through lanes, and a right turn lane. Court Street in both directions expands to a left, a through, and a through-right lane.



Lewiston

Auburn

STUDY
INTERSECTIONS

● Signalized

○ Unsignalized

Figure 2.1: Study Area

Lewiston

- Main Street/Lincoln Street – A “T” intersection – Main Street is two lanes in each direction plus a westbound left turn lane and a yield controlled eastbound right turn slip lane. Lincoln Street is two lanes northbound (both left turns) plus a right turn lane. Lincoln Street southbound is two lanes.
- Main Street/Lisbon Street/Canal Street – Canal Street is one lane one-way southbound while Lisbon Street is one lane northbound (left turn) plus a right turn lane. These form a split pair. Main Street is two lanes in each direction plus a westbound left turn lane. This intersection is complicated by long clearance times given the spacing of the Canal/Lisbon couplet.
- Main Street/Park Street – A “T” intersection – Main Street is two lanes in both directions plus a short westbound left turn lane while Park Street is two lanes southbound only.
- Main Street/Middle Street – Main Street is two lanes in both directions plus a very short westbound left turn lane which sometimes acts as an extension of the Park Street westbound left turn lane. Middle Street is two lanes southbound only.
- Main Street/Bates Street – Main Street is two lanes in both directions. Bates Street northbound is one-way south of the intersection with one lane plus a left turn lane. Bates Street southbound north of the intersection is two-way with one lane plus a left turn lane.
- Main Street/Sabattus Street/Hammond Street – a skewed intersection – Main Street is two lanes in each direction plus left turn lanes while Hammond Street is two lanes northbound away from the intersection. Main Street also has an eastbound right turn lane with a large channelizing island. Sabattus Street is one general purpose lane northbound plus a left turn lane allowing double lefts onto Main Street.
- Lisbon Street/Ash Street – Both streets are two lanes with Ash Street running westbound only and Lisbon running northbound only. Lisbon Street has a left turn lane and through lane arrangement while Ash Street has a through lane and right turn lane arrangement. Lisbon Street north of the intersection and Ash Street west of the intersection have only one lane.
- Lisbon Street/Pine Street – Pine Street is one-way eastbound with two lanes (left / through). Lisbon Street is also two lanes northbound at the intersection (through / right). Lisbon Street north of the intersection and Pine Street east of the intersection have only one lane.
- Lisbon Street/Chestnut Street – Lisbon Street is one-way northbound with two multipurpose lanes and Chestnut Street is one lane in each direction.
- Bates Street/Ash Street- Bates Street is one lane both directions plus a southbound right turn lane. Ash Street is one-way westbound with two multi-purpose lanes.

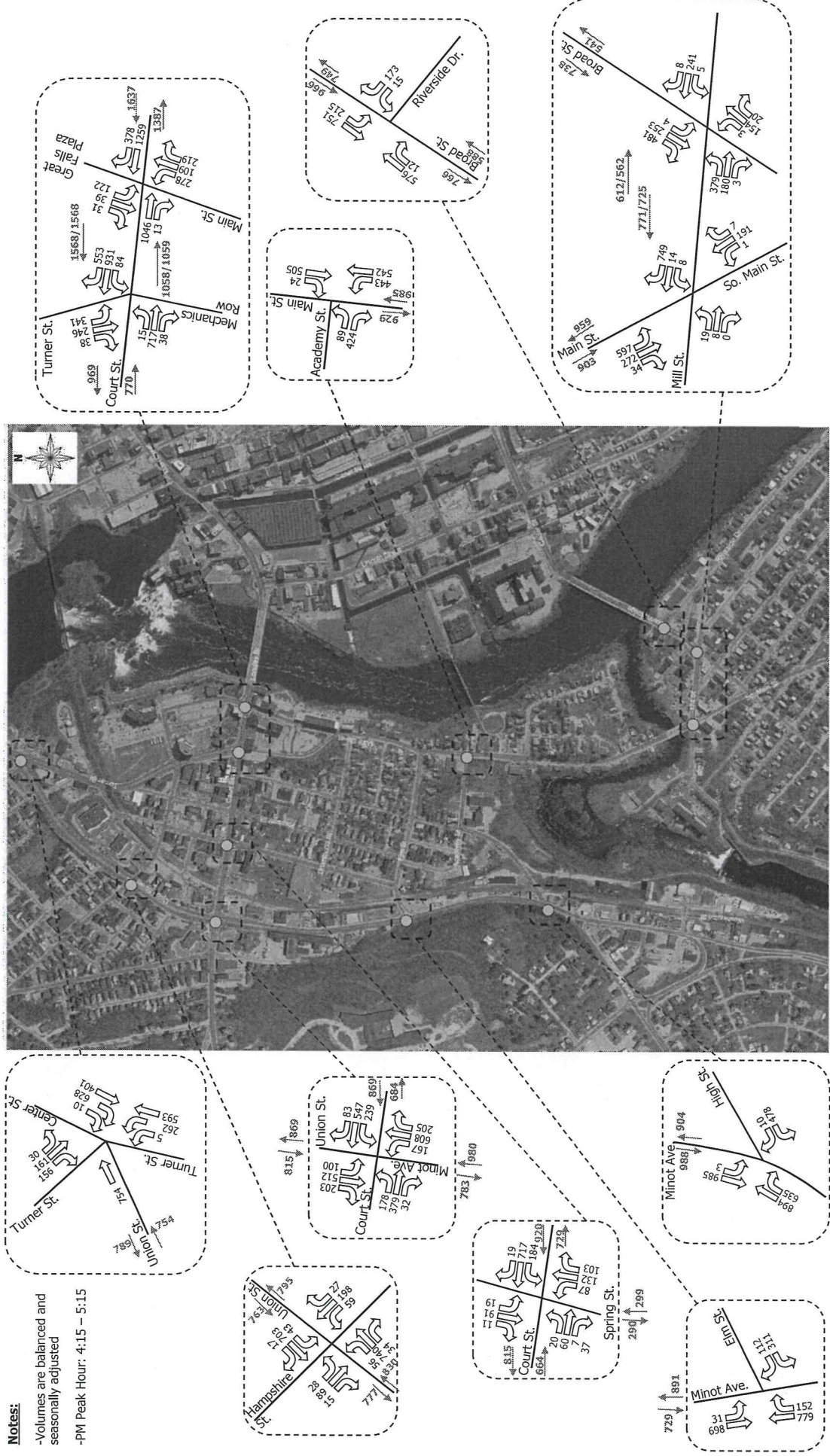


Figure 2.2: Auburn 2005 Existing Peak Hour Intersection Turning Movement Volumes

Notes:

- PM Peak Hour: 4:00 – 5:00, except as noted (in blue)
- Volumes are balanced and seasonally adjusted

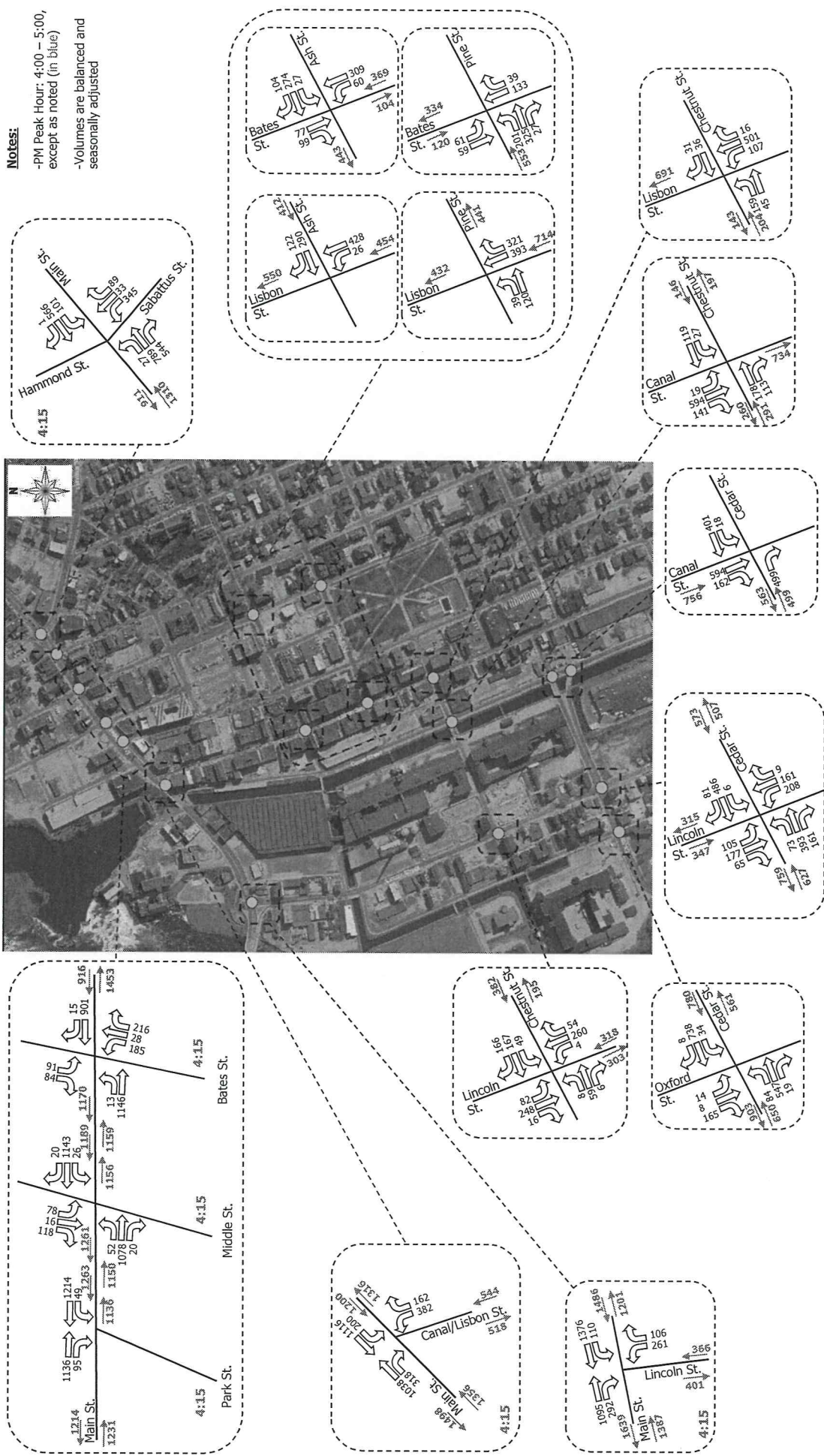


Figure 2.3: Lewiston 2005 Existing Peak Hour Intersection Turning Movement Volumes

afternoon peak hour was assumed to be the critical time period and used throughout the remaining analysis.

The intersections were divided into three groups and the peak hour for each group was determined to provide a conservative peak hour estimate for the study area. Using Maine DOT standard data and procedures, the counts were adjusted to the 30th highest hour, designated as the Design Hour. Also, 24-hour counts were taken during the intersection turning movement counts. This data was used to factor turning movement approach data if the turning movement data was more than 10% different than the 24-hour counts.

2.3. Existing Intersection Levels of Service

The intersection turning movement volumes developed for existing (2005) P.M. Design Hour conditions were used in combination with intersection control type (stop sign or traffic signal) and geometric characteristics to determine Levels of Service. "Level of Service" (LOS) is the standard measure used to quantify the operational performance of highway facilities as perceived by the user. The Levels of Services A, B, C, D, E and F are the six possible LOS ratings where "A" indicates excellent conditions with free flow, "E" indicates intolerable conditions with unstable flow, and "F" indicates that demand exceeds capacity.

Table 2.1 summarizes qualitative differences between the LOS ratings.

Table 2.1
Qualitative Level of Service Descriptions

Level of Service	Traffic Operations
LOS A	Free flow conditions, vehicles are completely unimpeded, and minimal delay at intersections
LOS B	The ability to maneuver in a traffic stream is only slightly restricted and there are insignificant delays at intersections.
LOS C	Traffic flow is stable but the ability to maneuver and change lanes is more restricted than LOS B. Vehicles begin to back-up at intersections.
LOS D	A small increase in traffic may cause substantial increases in delay at intersections and decreases of travel speeds on road segments.
LOS E	Significant delays at intersections with road segment travel speeds at approximately 1/3 of the posted speed.
LOS F	Extremely slow travel speeds, high delays, and extensive vehicle back-ups at intersections

Source: Highway Capacity Manual, 2000 Edition, Transportation Research Board, Washington, D.C.

Level of Service (LOS) for both signalized and stop-controlled intersections is measured in terms of average delay per vehicle. The delay, referred to as "control delay", includes the time required to

Signalized Intersection Performance

Tables 2.3 and 2.4 present overall intersection levels of service and delay for all signalized intersections during the P.M. Design Hour under existing (2005) conditions.

For Auburn (Table 2.3), two intersections have very poor levels of service. The Union Street Bypass/ Center Street/ Turner Street intersection is very busy and has an unusual layout both in the angles of the street entering the intersection, overall size, and necessary signal phasing. Broad Street at Riverside Drive is an unsignalized intersection where the northbound lefts, which are stop controlled, experience poor levels of service. (While this movement is actually prohibited, violations are frequent.) Other intersections have poor individual turning movements which may be a factor of pre-timed signal phasing and un-optimized signals.

Table 2.3
Auburn Signalized Intersection Performance Measures
Existing (2005) Weekday P.M. Design Hour

Study Intersection	Existing (2005)	
	Level of Service	Delay in (seconds)
Minot Avenue/High Street	B	14.8
Minot Avenue/Elm Street	B	14.6
Minot Avenue/Union Street By-Pass/Court Street	D*	40.1
Union Street By-Pass/Hampshire Street	B	12.6
Union Street By-Pass/Center Street/Turner Street	E*	69.8
Court Street/Spring Street	B	14.2
Court Street/Turner Street/Mechanics Row	C*	26
Court Street/Main Street/Great Falls Plaza	C	22.4
Main Street/Academy Street	C*	33.8
Main Street/Mill Street/South Main Street	C	20.2
Mill Street/Broad Street	C*	26.4
Riverside Drive/Broad Street	F*	168.7

Source: Wilbur Smith Associates

* denotes individual movement poor level of service – for more detail see appendix

Lewiston (Table 2.4) has no major intersections which have poor level of service. However, Main Street at Lisbon Street and Canal Street does have a poor turning movement for northbound left turns from Lisbon Street to westbound Main Street.

While level of service provides a measure of current traffic operations at specific intersections, it does not account for the interaction between intersections in the study area. A SimTraffic model (as noted below) can provide operations estimates which take into account these interactions.

- Vehicle Miles Traveled (VMT);
- Vehicle Hours Traveled (VHT); and,
- Average Travel Speed.

Table 2.5 presents the performance measures associated with the existing (2005) SYNCHRO SimTraffic Model.

Table 2.5
SimTraffic Performance Measures

Performance Measure	Existing (2005)
Vehicle Miles Traveled (VMT)	9,254
Vehicle Hours Traveled (VHT)	1,097
Average Speed (Miles per hour)	8.4

Source: Wilbur Smith Associates

3. Existing and Future Year Travel Demand Model

In order to forecast future year (2015 and 2025) traffic volumes, the Androscoggin Transportation Resource Center (ATRC) regional model was used. This modeling system has been developed by ATRC as the Metropolitan Planning Organization (MPO) for the greater Lewiston-Auburn region. Model outputs were refined to determine intersection level turning movement counts for the future forecast years. For the 2025 model, new Maine Turnpike interchanges, known as “Strategy 5” were included. This strategy, which is expected to be built by 2025, involves the construction of a full interchange with the Maine Turnpike at Route 136 in Auburn, and a half interchange with the Maine Turnpike at River Road in Lewiston (to and from the south/west).

For the forecast years, the following change in total study area intersection volumes during the afternoon peak hour is expected to be:

Year 2015: between 7.5% and 14.1% with an 8.9% average change, or about 0.9% per year

Year 2025: between 10.4% and 54.0% with a 19.3% average change, or about 1.8% per year

Figures 3.1 and 3.2 show individual entering traffic growth for the study area intersections. The increases in the 2025 scenario are much larger for the intersections of:

- Main Street and Academy Street (Auburn)
- Lincoln Street and Chestnut Street (Lewiston)
- Lincoln Street and Cedar Street (Lewiston)
- Chestnut Street and Canal Street (Lewiston)
- Chestnut Street and Lisbon Street (Lewiston)

The large variations in 2025 likely have to do with the inclusion of the new Maine Turnpike interchanges in the 2025 scenario and their impact on specific streets.

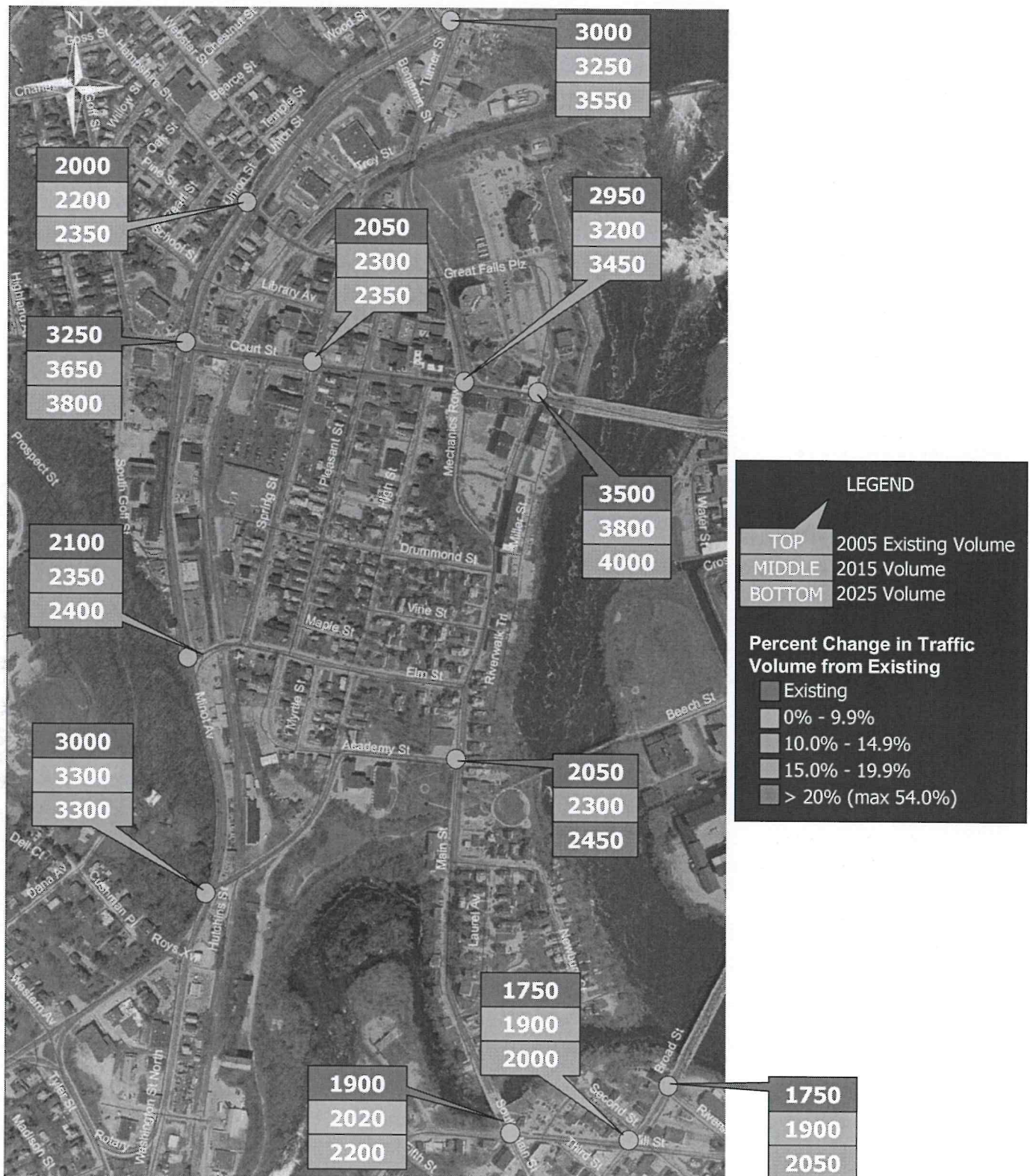


Figure 3.1: Auburn PM Peak Hour Traffic Forecast

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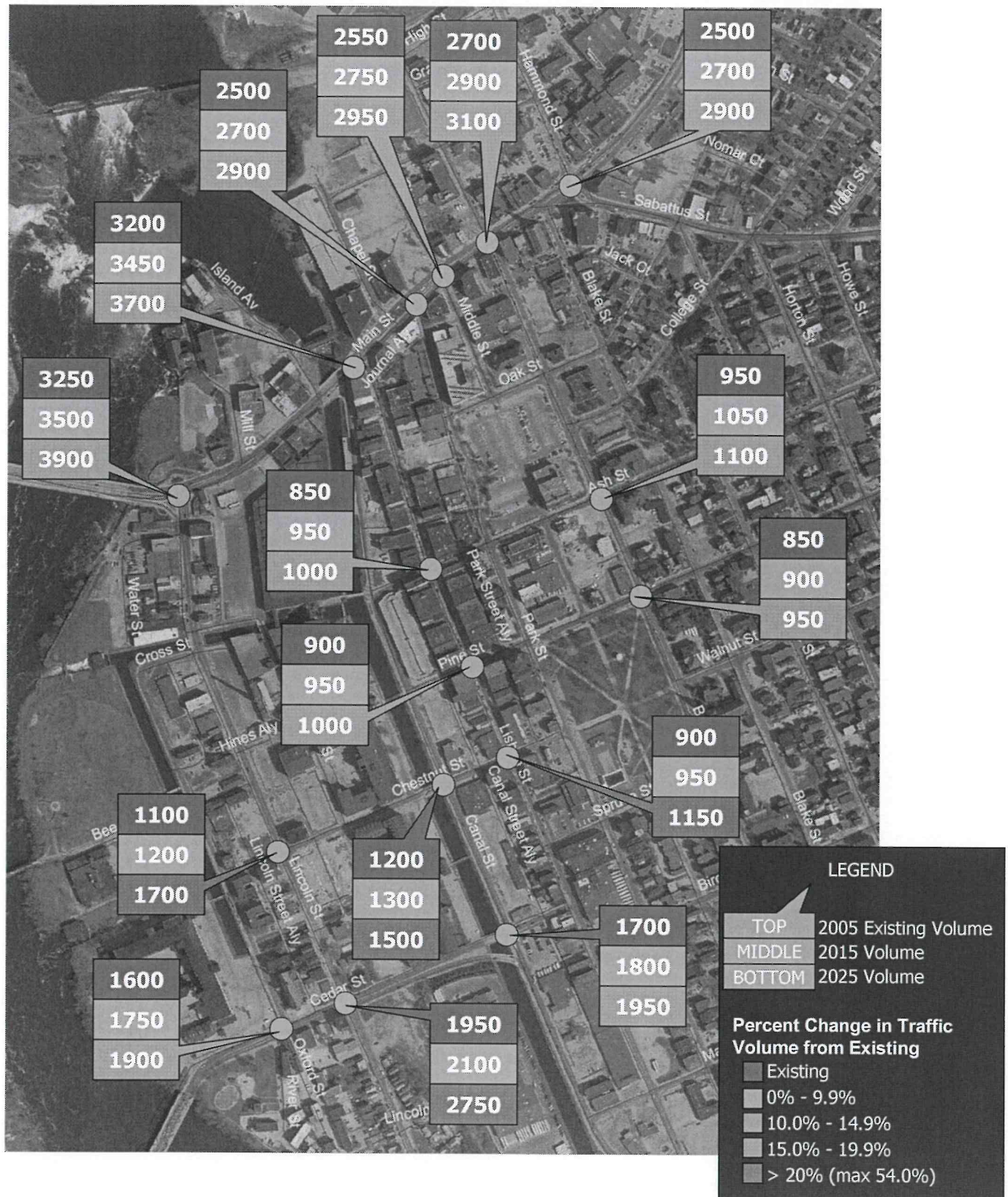


Figure 3.2: Lewiston PM Peak Hour Traffic Forecast

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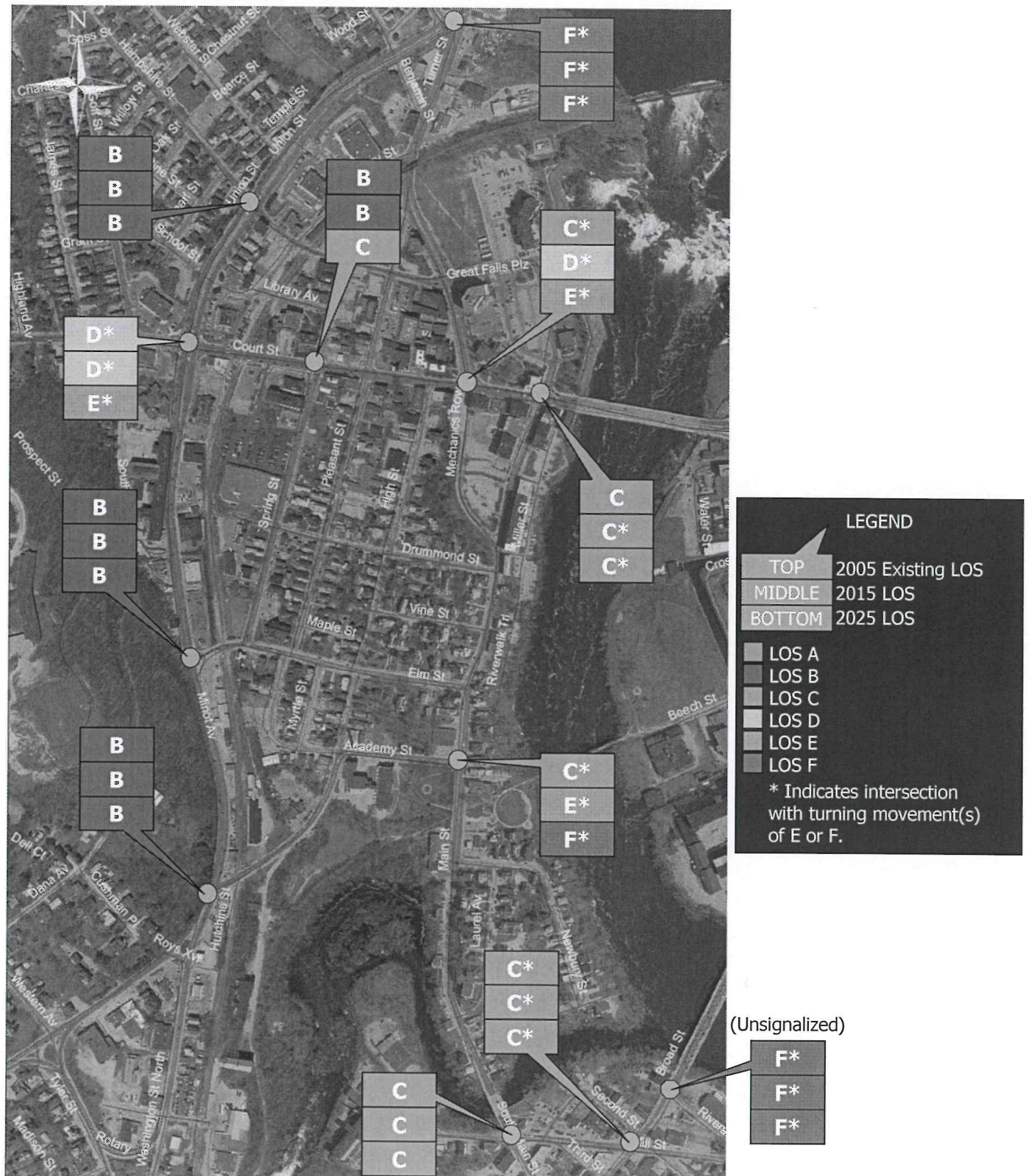


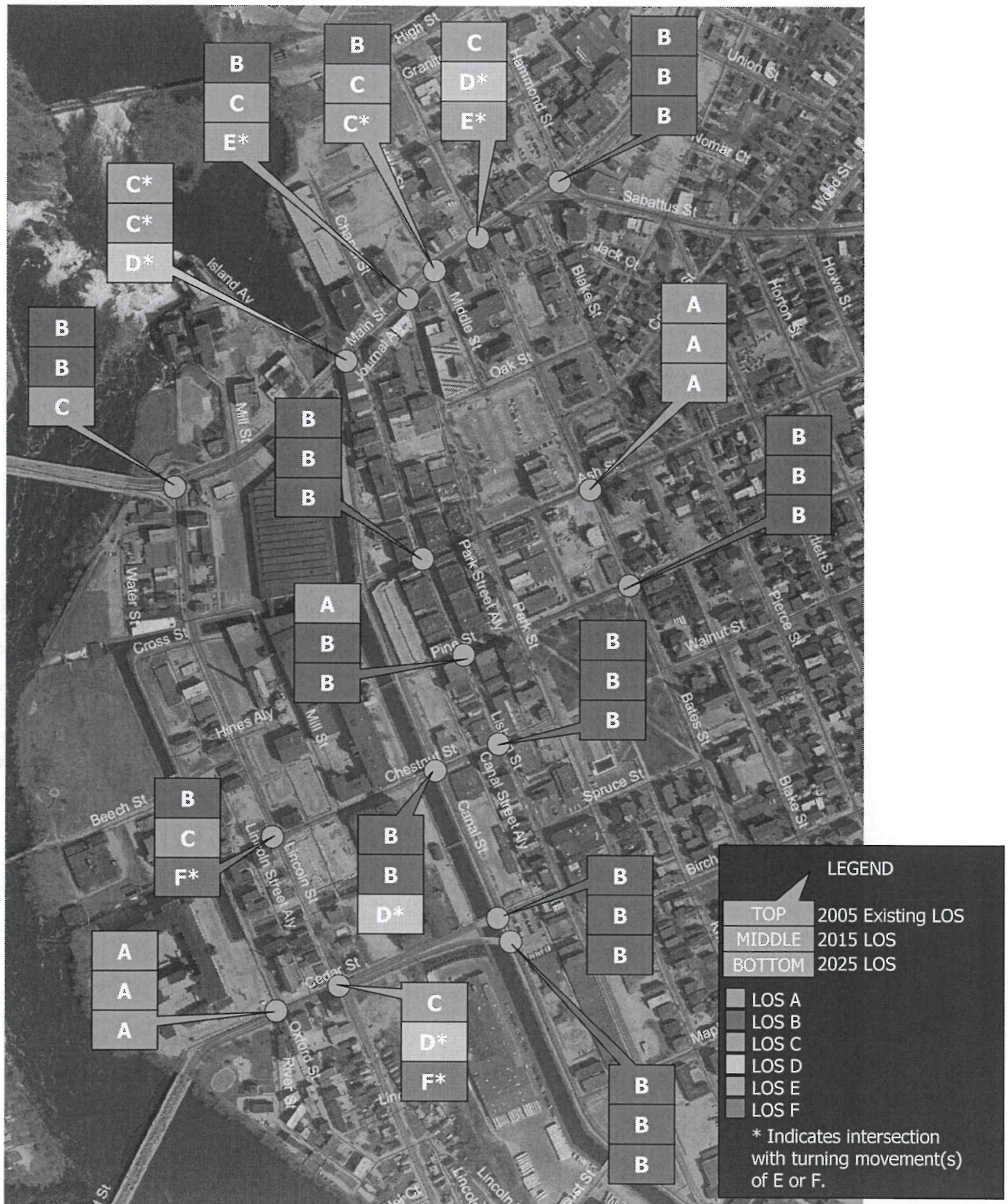
Figure 4.1: Auburn Level Of Service (LOS)

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Table 4.1
Intersection Volume, Delay, and Level of Service - Auburn

Intersection	2005			2015			2025		
	Volume (vph)	Delay (sec)	LOS	Volume (vph)	Delay (sec)	LOS	Volume (vph)	Delay (sec)	LOS
Minot Avenue/High Street	3,007	14.8	B	3,297	16.9	B	3,320	17.1	B
Minot Avenue/Elm Street	2,085	14.6	B	2,363	16.3	B	2,398	16.4	B
Minot Avenue/Union Street By-Pass/Court Street	3,253	40.1	D*	3,655	49.6	D*	3,796	56.6	E*
Union Street By-Pass/Hampshire Street	2,009	12.6	B	2,179	13.9	B	2,344	15.6	B
Union Street By-Pass/Center Street/Turner Street	3,000	87.8	F*	3,271	119.8	F*	3,541	156.4	F*
Court Street/Spring Street	2,027	14.2	B	2,314	20	B	2,370	23.6	C
Court Street/Turner Street/Mechanics Row	2,964	26	C*	3,214	48.5	D*	3,446	76.3	E*
Court Street/Main Street/Great Falls Plaza	3,494	22.4	C	3,779	28.3	C*	4,022	34.2	C*
Main Street/Academy Street	2,029	33.8	C*	2,306	64.6	E*	2,458	85.8	F*
Main Street/Mill Street/South Main Street	1,900	20.2	C	2,043	22.3	C	2,185	26.1	C
Mill Street/Broad Street	1,731	26.4	C*	1,875	29.2	C*	1,991	33.6	C*
Riverside Drive/Broad Street (Unsignalized)	1,744	168.7	F*	1,876	340.4	F*	2,038	632.3	F*

* = at least one movement Level of Service E or F, vph = vehicles per hour, delay is shown in seconds of delay per vehicle on average

Source: Wilbur Smith Associates

Table 4.2
Intersection Volume, Delay, and Level of Service - Lewiston

Intersection	2005			2015			2025		
	Volume (vph)	Delay (sec)	LOS	Volume (vph)	Delay (sec)	LOS	Volume (vph)	Delay (sec)	LOS
Main Street/Lincoln Street	3,242	15.0	B	3,493	17.5	B	3,883	26	C
Main Street/Lisbon Street/Canal Street	3,219	28.7	C*	3,467	34.7	C*	3,709	41.5	D*
Main Street/Park Street	2,496	17.9	B	2,711	29.4	C	2,908	56.9	E*
Main Street/Middle Street	2,552	18.5	B	2,744	22.2	C	2,945	29.6	C*
Main Street/Bates Street	2,680	32.3	C	2,881	46.4	D*	3,111	78.2	E*
Main Street/Sabattus Street/Hammond Street	2,496	15.7	B	2,687	17.3	B	2,909	18.9	B
Lisbon Street/ Ash Street	868	14.3	B	939	16	B	998	18	B
Lisbon Street/Pine Street	875	9.7	A	958	10.2	B	1,025	10.6	B
Lisbon Street/Chestnut Street	896	14.5	B	964	15.4	B	1,165	19.2	B
Bates Street / Ash Street	951	8.3	A	1,029	8.8	A	1,094	9.4	A
Bates Street/Pine Street	846	12.8	B	917	13.4	B	973	13.6	B
Canal Street/Chestnut Street	1,192	13.5	B	1,281	14.8	B	1,502	40.8	D*
Canal Street/Cedar Street (North)	1,175	11.8	B	1,263	11.9	B	1,363	12.3	B
Canal Street/Cedar Street (South)	1,111	10.4	B	1,195	10.6	B	1,289	10.7	B
Lincoln Street/Chestnut Street	1,119	18.2	B	1,208	21.5	C	1,723	161.8	F*
Lincoln Street/Cedar Street	1,925	25.6	C	2,088	38.4	D*	2,755	136.6	F*
Oxford Street/Cedar Street	1,618	6.4	A	1,739	7.1	A	1,888	8.3	A

* = at least one movement Level of Service E or F, vph = vehicles per hour, delay is shown in seconds of delay per vehicle on average
Source: Wilbur Smith Associates

4.2. SimTraffic Performance Measures

The Synchro/HCM methodology provides detailed operational analysis at the intersection level. However, each intersection is evaluated at a mostly independent level using this methodology. The Synchro/SimTraffic software package also provides a micro-simulation model which takes into account interaction between signals and the impact of multiple closely-spaced signals on traffic, queues, actuated signal timing, etc. Simulations were run for the existing condition, 2015 forecast, and 2025 forecast traffic levels, but with no modifications neither to the transportation network nor to the signal system itself within the study area. (As explained earlier, the traffic forecasts assume projects in the greater Lewiston-Auburn area are implemented as planned, however none of these are located within the immediate study area.) Five one hour simulations using different random inputs for each of the three scenarios were executed and the average of the simulations reported as shown below.

Table 4.3 presents the performance measures associated with the existing and future simulations with forecasted traffic and no improvements to the study area intersections.

Table 4.3
Simulation Performance Measures

Performance Measure	Existing 2005	Future 2015	Future 2025
Vehicle Miles Traveled (VMT)	9,254	9,363	9,175
Vehicle Hours Traveled (VHT)	1,097	1,696	2,531
Average Speed (Miles per hour)	8.4	5.5	3.6
Average Delay per Vehicle (seconds)	188.4	323.5	518.2

Source: Wilbur Smith Associates

As the amount of traffic on the study area street network increases, the delay per vehicle increases significantly while the average speed decreases significantly. Also, the vehicle miles of travel decreases significantly in the 2025 scenario. This is due to the large decrease in speed and the ability of fewer vehicles to travel through the network during the simulation period. The significant increase in delays as traffic increases are also indicated by long queues and slower speeds in the simulation itself. The overall delay per vehicle was reviewed for each intersection. Locations with more than 80 seconds of delay are identified in **Table 4.4**.

Table 4.4
Auburn Simulation Congestion Locations
 (80 seconds or more of delay per vehicle)

2005 Existing Conditions	Delay per Vehicle (Seconds)
Union Street By-Pass / Center Street / Turner Street	124
TOTAL: 1 Intersections	

2015 Future Conditions	
Main Street / Academy Street	224
Union Street By-Pass / Center Street / Turner Street	207
Court Street / Turner Street / Mechanics Row	125
Court Street / Main Street / Great Falls Plaza	103
Mill Street / Broad Street	96
TOTAL: 5 Intersections	

2025 Future Conditions	
Union Street By-Pass / Center Street / Turner Street	411
Main Street / Academy Street	337
Court Street / Turner Street / Mechanics Row	266
Mill Street / Broad Street	157
Court Street / Main Street / Great Falls Plaza	152
Riverside Drive / Broad Street	145
Main Street / Mill Street / South Main Street	132
Court Street / Spring Street	117
Minot Avenue / Union Street By-Pass / Court Street	106
TOTAL: 9 Intersections	

Source: Wilbur Smith Associates

Table 4.5
Lewiston Simulation Congestion Locations
 (80 seconds or more of delay per vehicle)

2005 Existing Conditions	Delay per Vehicle (Seconds)
Main Street / Lisbon Street / Canal Street	177
TOTAL: 1 Intersections	

2015 Future Conditions	
Main Street / Lisbon Street / Canal Street	214
Lisbon Street / Chestnut Street	158
Lisbon Street / Ash Street	99
Main Street / Bates Street	85
TOTAL: 4 Intersections	

2025 Future Conditions	
Lisbon Street / Chestnut Street	341
Main Street / Lisbon Street / Canal Street	190
Bates Street / Pine Street	133
Lincoln Street / Cedar Street	112
Main Street / Lincoln Street	96
Lincoln Street / Chestnut Street	95
Lisbon Street / Ash Street	91
Main Street / Bates Street	89
Bates Street / Ash Street	81
TOTAL: 9 Intersections	

Source: Wilbur Smith Associates

As indicated in **Tables 4.4 and 4.5**, the number of intersections with significant delay increases dramatically in the future year scenarios if nothing is done. The congested locations are shown in **Figures 4.3 to 4.5**.

5. Lewiston-Auburn Central Business District Improvement Plan

Using a combination of the level of service analysis, simulation results, and field observations, improvements for the downtown Lewiston-Auburn Central Business District were synthesized and tested using the same analysis techniques used for the existing configurations analysis summarized earlier in this report. Some improvements were studied individually, while others were studied collectively.

5.1. Signal Optimization and Coordination

Main Street / Court Street Signal Actuation, Coordination, and Optimization

One of the most apparent improvements which could be made to the study area transportation network would be to actuate, optimize, and coordinate the signals along Court Street (Auburn) and Main Street (Lewiston) from Minot Avenue to Sabbattus Street. Using the signal/network optimization features of the Synchro/SimTraffic software, an actuated, optimized, and coordinated signal system was tested. The results are shown in **Table 5.1**.

Table 5.1
Network Performance Measures with Court Street / Main Street Actuated, Optimized, and Coordinated Signal System

Performance Measure	Existing Configuration 2015	Improved Court/Main Signals 2015	Existing Configuration 2025	Improved Court/Main Signals 2025
Vehicle Miles Traveled (VMT)	9,363	10,250	9,175	10,501
Vehicle Hours Traveled (VHT)	1,696	1,124	2,531	1,805
Average Speed (Miles per hour)	5.5	9.1	3.6	5.8
Average Delay per Vehicle (seconds)	323.5	167.8	518.2	308.9

Source: Wilbur Smith Associates

The reduction in travel delay, the increase in average speed, and the reduction in vehicle hours of travel is quite significant with this improvement in place. Furthermore, the Vehicle Miles of Travel increases significantly. While this is usually considered a negative result, in this case it indicates more vehicles complete trip making during the peak hour. Thus the congested time period on the street network is reduced.

While the work necessary to complete this improvement is beyond the scope of this study, the base network files have been provided to the Androscoggin Transportation Resource Center for use in planning and design of this improvement.

All Other Street Signalized Intersections Actuation and Optimization

As part of an overall improvement plan, actuation and optimization of all the traffic signals was studied. This plan may involve signal and controller upgrades. The simulation model showed when combined with the Court Street / Main Street signal improvements described above. The results are given below.

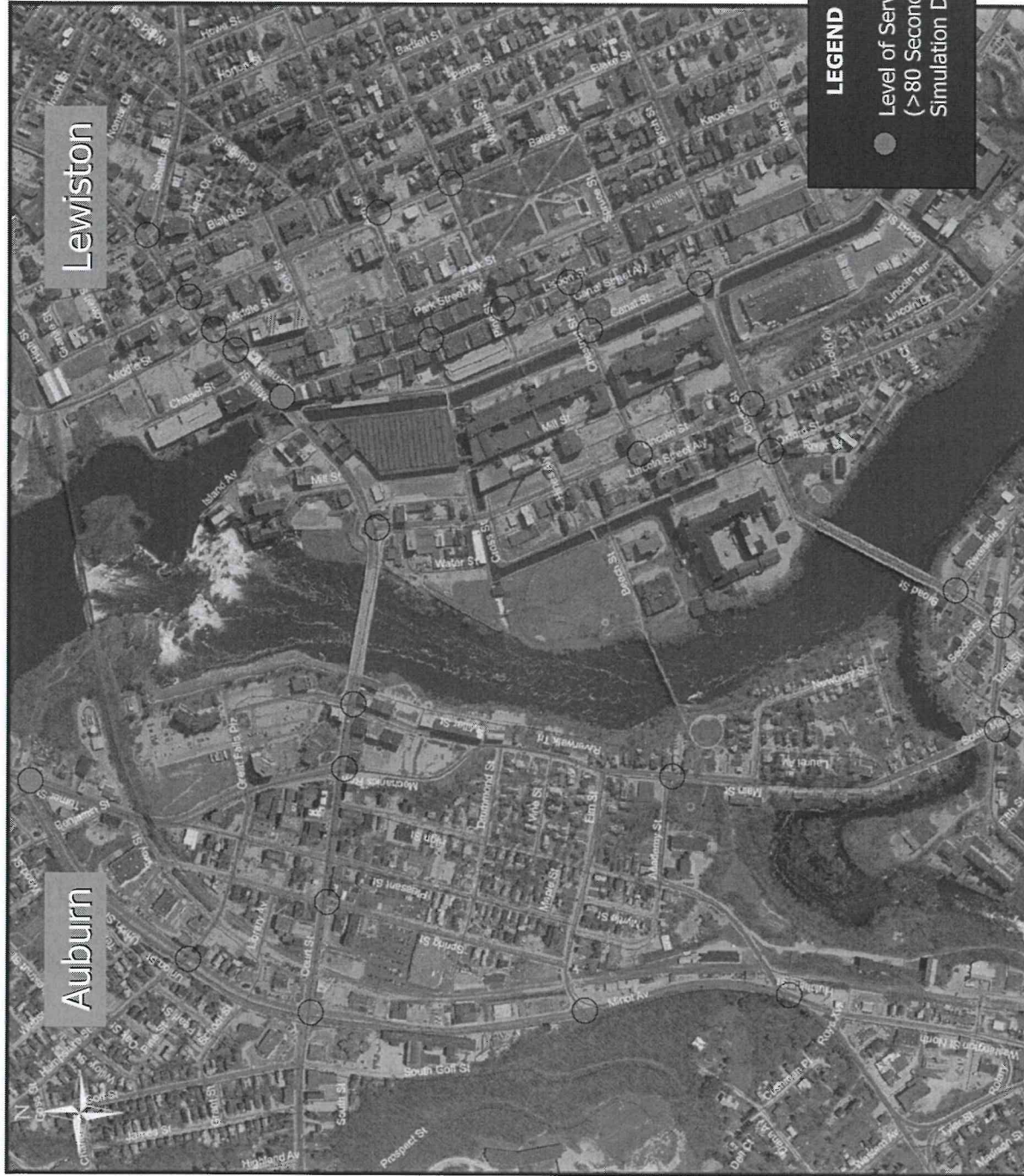


Figure 4.3: Congestion Hot Spots 2005



Figure 4.4: Forecasted Congestion Hot Spots 2015

(Forecasted without improvements)

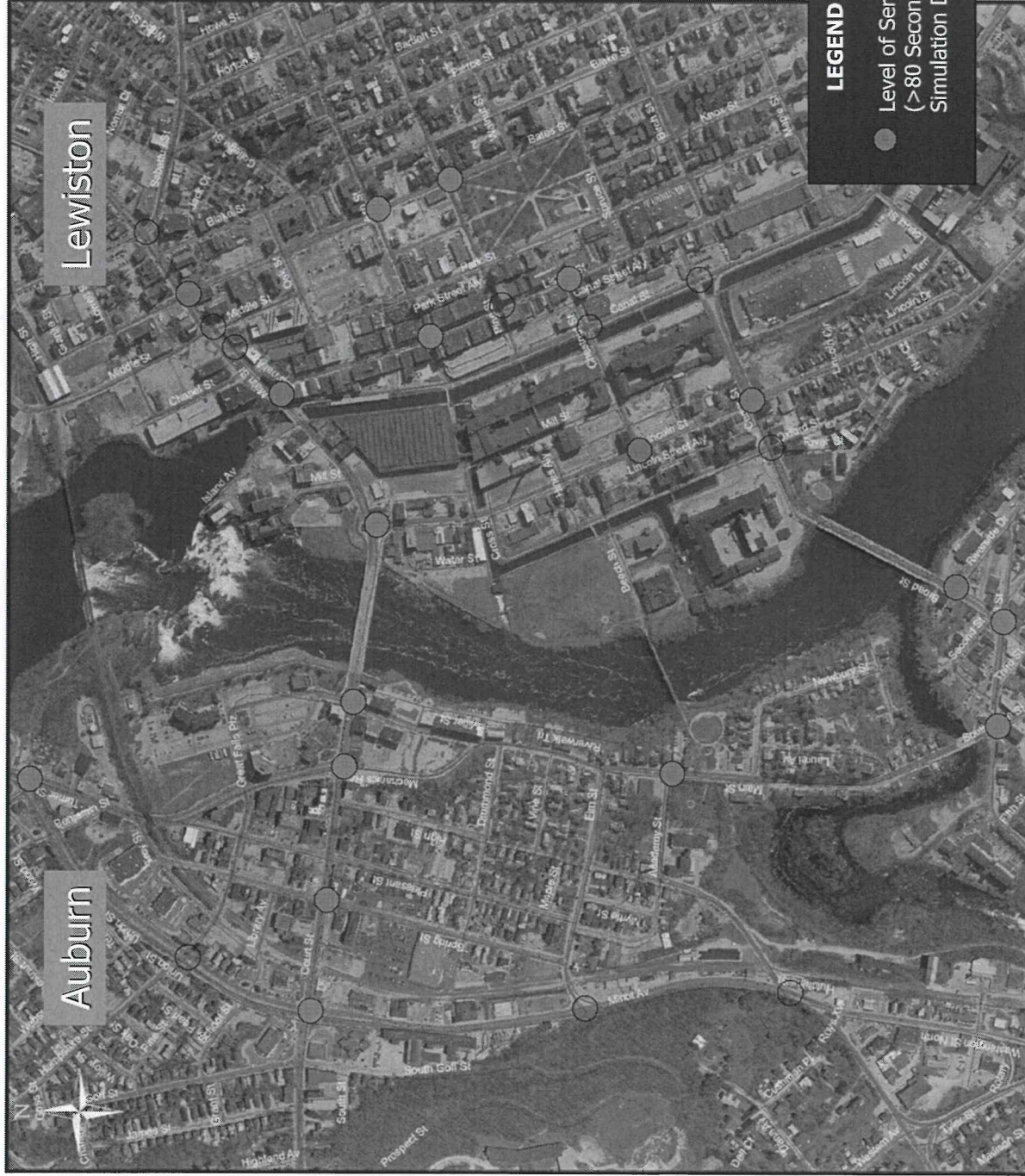


Figure 4.5: Forecasted Congestion Hot Spots 2025

(Forecasted without improvements)

Table 5.2
Network Performance Measures with All Intersections Actuated and Optimized

Performance Measure	Existing Configuration 2015	All Signals Improved 2015	Existing Configuration 2025	All Signals Improved 2025
Vehicle Miles Traveled (VMT)	9,363	10,411	9,175	10,797
Vehicle Hours Traveled (VHT)	1,696	917	2,531	1,433
Average Speed (Miles per hour)	5.5	11.4	3.6	7.5
Average Delay per Vehicle (seconds)	323.5	117.4	518.2	215.8

Source: Wilbur Smith Associates

The improvements with this overall re-configuration are quite significant. As with the Court Street / Main Street corridor improvements, the Vehicle Miles of Travel increases significantly indicating more vehicles complete trip making during the peak hour, reducing the length of the afternoon congested period.

While the work necessary to complete this improvement is beyond the scope of this study, the base network files have been provided to the Androscoggin Transportation Resource Center for use in planning and design of this improvement.

5.2. Auburn Conceptual Improvements

A variety of additional conceptual improvements were studied for the Auburn portion of the study area as shown in **Figure 5.1**. A summary of these and the rationale is given below.

Union Street Bypass / Center Street / Turner Street

The intersection of Union Street Bypass, Center Street, and Turner Street is a very complicated problem. The intersection includes a non-standard layout with streets entering the intersection at odd angles (significantly greater or less than 90 degrees). Also, the intersection is spread out over a large area which increases the necessary clearance time between signal phases. Owing to the access to shopping centers north of town as well as other factors, the intersection serves as a major intersection of town and regional traffic flows. Finally, several private commercial driveways have direct access to the intersection streets very close to, and some within, the intersection.

The first improvement at this location would be to actuate and optimize the signal. Signal operations would remain at LOS F, but the delay would decrease slightly from 156 seconds to 150 seconds. The simulation delay results showed much greater improvement, from 719 seconds to 415 seconds, but the operations are still very poor.

Additional improvements at this location might include adding a southbound right turn lane on Center Street. This would allow the southbound approach to be reconfigured from a Through/Through-Right/Right three lane configuration to a Through/Through/Right/Right four lane configuration. The new configuration would provide additional lane capacity and allow the signal phasing to change, such that southbound right turns occur when the eastbound Union Street By-pass left turns are allowed. (This is known as “overlap” phasing.) An additional improvement added to this scenario would be to re-stripe southeast-bound Turner Street from a general purpose lane plus a dedicated right turn lane, to a through/left turn lane and a through/right turn lane. Finally, the signal may be actuated and optimized. Testing of this scenario showed a decrease in delay per vehicle from 156 seconds to 83 seconds for year 2025 traffic. However, the 83 second resulting delay is still considered LOS F. Similar results were found when the intersection was simulated, with a decrease in delay per vehicle from 719 seconds of delay to 158 seconds of delay for year 2025 traffic.

Another improvement studied at this location would be to reconfigure the intersection to a modern one-lane roundabout. In this case, the analysis showed the LOS would remain LOS F, but the delay would decrease from 156 seconds to 107 seconds. Also, a two-lane roundabout was studied at this location. For this scenario, the delay would decrease from 156 seconds to 3 seconds, and the LOS would improve from F to A. While the operational analysis results imply a two-lane roundabout would vastly improve intersection operations, physical constraints would make implementing such an arrangement difficult. A right of way study would be needed to determine what land is needed to complete a roundabout. Preliminary review indicates portions of the angle made by northbound Turner Street and eastbound Union Street as well as portions of the lot east of the intersection may be needed for a roundabout. Also, public acceptance and comprehension of a two-lane roundabout are factors in deciding whether such a roundabout is appropriate. Finally, pedestrian circulation issues would also need to be addressed.

Summary

- Actuation and Optimization may lessen delay, but will not solve poor operational issues

Signalized Intersection Option

- Reconfigure southbound Center Street approach to Through/Through/Right/Right (Possible need for more right of way)
- Reconfigure southeast-bound Turner Street to Left-Through/Through-Right
- Actuate and Optimize
- HCM delay per vehicle reduction from 156 seconds (LOS F) to 83 seconds (LOS F)
- Simulation delay per vehicle reduction from 719 seconds to 158 seconds

Roundabout Option

- One lane roundabout – HCM delay per vehicle reduction from 156 seconds (LOS F) to 107 seconds (LOS F)
- Two lane roundabout – HCM delay per vehicle reduction from 156 seconds (LOS F) to 3 seconds (LOS A)
- Need to address difficulty of configuring a roundabout within the intersection area and managing safe and efficient access and operations

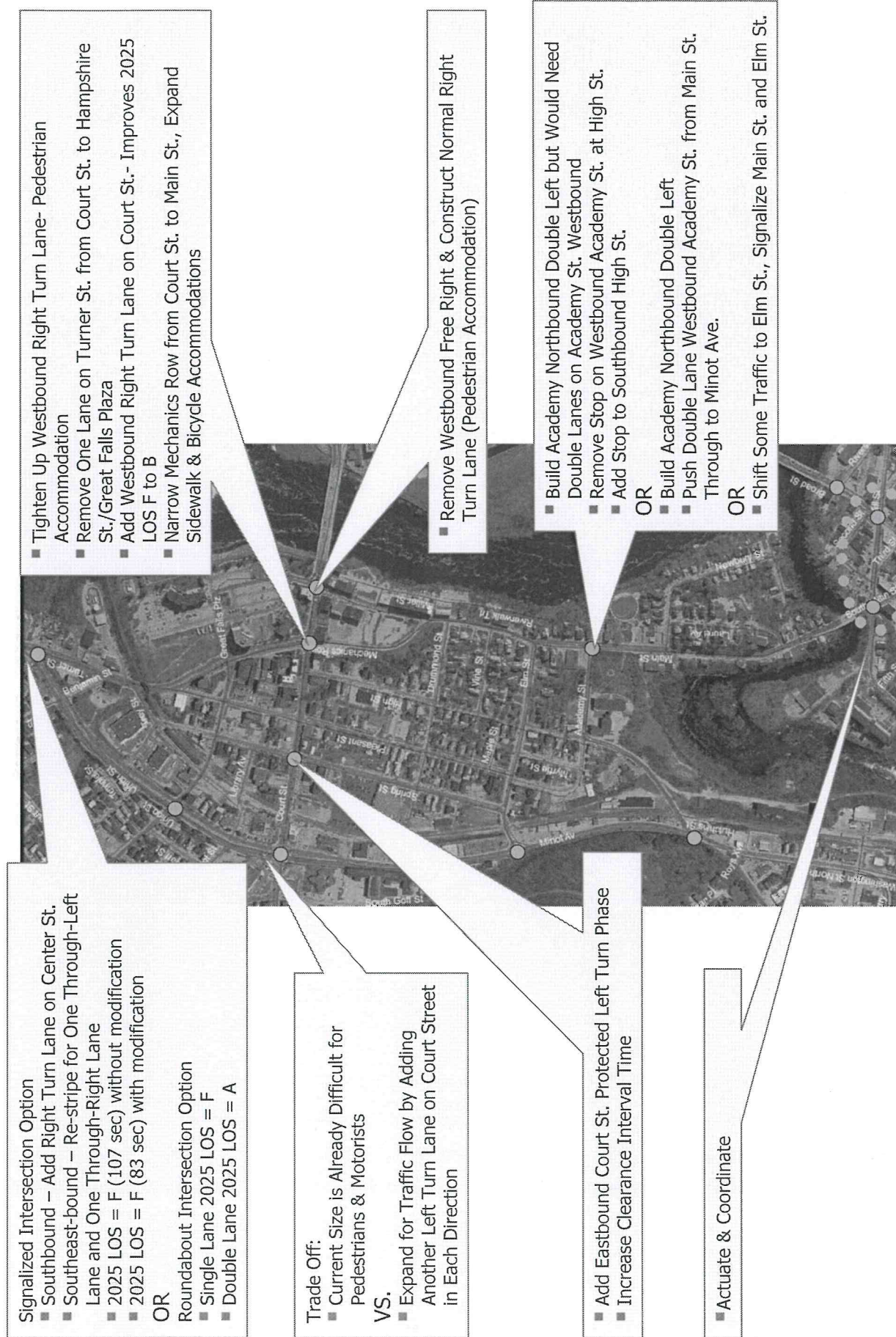


Figure 5.1: Auburn Conceptual Improvements

Minot Avenue/Court Street/ Union Street Bypass

This large, conventional intersection ranks in the top five intersections in the study area for peak hour volumes. Currently, the intersection operates at LOS D (40 seconds of delay per vehicle) which is acceptable; however the westbound lefts operate at LOS E, which should be addressed. The intersection is expected to worsen to LOS E (57 seconds of delay) by 2025, with all four left turns operating at LOS E or F. Simulation showed a delay of 107 seconds per vehicle for the year 2025 estimated traffic.

The first improvement studied at this intersection is to actuate, optimize, and coordinate the signal with the Court Street/Main Street system. This would have the effect of improving the LOS to D (46 seconds) in 2025, but poor operations remain for several movements including northbound and southbound left turns. Simulation of the same improvement reduces estimated 2025 delay at the intersection from 107 seconds per vehicle to 60 seconds per vehicle.

The second improvement studied is an expansion to double left turn lanes for the eastbound and westbound Court Street approaches. This would have the effect of improving the LOS to D (38 seconds) in 2025, with all movements being acceptable. Similarly, simulation delay estimates were reduced from 107 seconds per vehicles to 36 seconds per vehicle. However, this improvement would be difficult to implement given the intersection's very large layout at this point. The improvement would likely require additional right of way and would be problematic for pedestrians due to the extra crossing time.

Summary

Existing Intersection Option

- Actuate, optimize, and coordinate the signal with the Court Street/Main Street system
- Level of Service improvement from E (57 seconds delay) to D (46 seconds) but poor LOS remains for key turning movements

Expanded Intersection Option

- Actuate, optimize, and coordinate the signal with the Court Street/Main Street system and expand eastbound and westbound Court Street from single to double left turn lanes
- Level of Service improvement from E (57 seconds delay) to D (38 seconds) with no poor turning movements
- Very difficult to expand intersection given large current size, pedestrian crossing issues

Mill Street at Broad Street and Main Street

These two intersections are closely spaced and serve traffic using the South Bridge connection over the Androscoggin River. Under the existing configuration, both intersections operate at LOS C overall, but westbound through-left turn traffic at Broad Street operates poorly. By 2025, the Broad Street intersection is still expected to operate at LOS C (34 seconds of delay per vehicle), but the westbound through-left turn traffic is expected to operate even worse. Given the two intersection's proximity and traffic served, actuating, optimizing, and coordinating the signals was tested. With

this improvement, 2025 level of service for the Broad Street intersection would be C (21 seconds) and Main Street would be B (18 seconds) and all turning movements are acceptable.

Summary

- Actuate, optimize, and coordinate the two intersections
- 2025 Mill Street and Broad Street intersection improved from C (34 seconds) with poor westbound through/left operations to LOS C (21 seconds) with no poor operations
- 2025 Mill Street and Main Street intersection improved from C (26 seconds) to B (18 seconds)

Main Street / Academy Street

This intersection has a simple “T” layout, but serves large volumes of northbound left turn and eastbound right turn traffic. This traffic is likely using Main Street and Academy Street to access South Bridge and Lewiston to the east, as well as the Maine Turnpike connection and other major routes to the west. Currently, the intersection operates at LOS C (34 seconds of delay per vehicle) with northbound left turns operating at LOS E, which indicates improvements should be implemented. By 2025, the LOS will likely degrade to F (86 seconds) with poor operations for both the northbound left and southbound through movements. The first improvement tested was to actuate and optimize the signal. This would likely improve year 2025 overall operations to LOS D (46 seconds) with only the northbound lefts having a poor LOS. Making additional improvements at this location will likely prove to be difficult, given the right of way and current street configurations.

Adding a second northbound left turn lane would likely increase year 2025 overall operations to LOS C (20 seconds) with no poor movements. However, a double receiving lane westbound would be needed. Academy Street westbound has an uphill grade and meets High Street at a Stop controlled intersection. Since traffic appears to head west on Academy Street and south on High Street to the Minot Avenue signal, this two lane configuration would likely need to be carried all the way to Minot Avenue. Also, the Stop controlled intersection of High Street and Academy Street would likely need to be reconfigured to allow westbound traffic free flow onto High Street.

Another option would be to again put in a northbound double left turn at Academy Street and Main Street, and push through a two-lane westbound Academy Street straight west to Minot Avenue. This may involve adding a signal on Minot Avenue and possible removing one of the other two signals (Minot Avenue at High Street or Elm Street). A railroad crossing is also needed.

Finally, it may be possible to encourage some amount of the northbound left turn traffic to continue north on Main Street and use Elm Street to access Minot Avenue. This option may involve adding another signal at Main Street and Elm Street, but would likely not require the additional signal or signal reconfiguration at Minot Avenue or the northbound double left at Main Street and Academy Street.

Summary

- Actuate and optimize signal to improve 2025 LOS from F (86 seconds) to D (46 seconds), however northbound left turn operation still poor

- Option 1: Add a second northbound left turn lane, actuate and optimize signal, add westbound Academy Street through lane, reconfigure Academy Street / High Street intersection to allow free flow from Academy Street to Minot Avenue. 2025 LOS improvement from F (86 seconds) to C (20 seconds). Problematic addition of westbound Academy lane given right of way and grade
- Option 2: Add second northbound turn lane, push a two lane Academy Street westbound through to Minot Avenue. May require additional signal on Minot Avenue along with removal of High Street / Minot Avenue signal. Right of way issues may control.
- Option 3: Encourage traffic to use Elm Street instead. May allow Academy Street to operate better and Elm Street is a wider street than Academy Street. However, a new signal at Elm Street and Main Street would likely be needed. Also, the method of diverting some traffic, but not all traffic, to Elm Street is unknown.

Court Street / Spring Street

This intersection is located along the main spine of the study area. Operationally, the intersection works well currently at LOS B (14 seconds delay per vehicle) and is forecast to operate well at LOS C (24 seconds) in 2025. However, a large number of accidents were noted at this location. Crash analysis determined a pattern of left-turn angle collisions involving eastbound Court Street left-turn movements. Thus, it is recommended an eastbound protected left turn phase be added at this location, as well as increasing interval clearance time in the signal timing.

Summary

- Level of Service is OK
- Add eastbound Court Street protected left turn phase and increase clearance times for safety

Court Street / Turner Street / Mechanics Row

This intersection is along the main spine of the study area and accommodates a large amount of westbound right turn traffic to northbound Turner Street. This traffic was accommodated by a separate right turn lane in the past; however the lane has been removed. Currently, the intersection operates at LOS C (26 seconds delay per vehicle), however southbound through-right turn movement operate at LOS E. In 2025, the intersection is forecasted to operate at LOS E (76 seconds) with all westbound and some southbound movements operating at LOS F.

The first option for improvement at this location is through the actuation, optimization, and coordination of the Court Street / Main Street corridor. This would not change the overall LOS letter grade, but would improve the delay from 76 seconds to 71 seconds in the 2025 scenario. The results of the simulation show a much greater impact for the main line optimization, lowering the delay per vehicle in the 2025 scenario from 266 seconds to 56 seconds.

The next option for improvement would be to add a westbound right turn lane. However, this would increase an already long pedestrian crossing on the northern leg of the intersection. To solve this problem, the conceptual improvement includes narrowing Turner Street from Court Street north at least half way to Hampshire Street to one lane. Then, both a narrower crossing and a pedestrian refuge between the northbound and southbound traffic on Turner Street at Court Street

can be established to accommodate pedestrian needs. Also, to avoid the high speed right turns associated with channelized yield control intersections, it is recommended this new westbound right turn lane be a standard lane with signal control. This option also includes re-optimizing the entirety of the Court Street / Main Street corridor. As a result, the intersection LOS would be improved to B (12 seconds) for the 2025 scenario. The simulation also showed significant improvements, reducing intersection delay from 266 seconds for the current 2025 configuration to 23 seconds for the modified configuration.

Suggestions from the project steering committee at this location included changing the two westbound through lanes into a through lane and a left turn lane. Testing of this option showed poorer level of service and longer delays for the overall intersection.

Another improvement reviewed in this area involves the layout of Mechanics Row south of the intersection. While the street is one lane, one direction southbound, the lane and pavement are very wide. Consequently the roadway could be narrowed from Minot Avenue to Main Street and enhancing bicycle and pedestrian facilities. This would further enhance access to the riverfront.

Summary

- Overall LOS is sufficient currently, but southbound through-right turns are poor. This situation will worsen to a LOS E (76 seconds) in 2025 with additional poor movements with no improvements. Simulated delay is estimated to be 266 seconds per vehicle.
- Actuation, optimization, and coordination of the Court Street / Main Street corridor, would result in a slight improvement to LOS E (71 seconds) in 2025. Simulated delays are estimated to improve to 56 seconds per vehicle.
- Add signal controlled, non-channelized westbound right turn lane and re-optimize Court Street / Main Street Corridor. Improvement to LOS B (12 seconds) in 2025 with simulated delays decreasing to 23 seconds per vehicle.
- Narrow Turner Street northbound to one lane from Minot Avenue half way to Hampshire Street, add pedestrian refuge between northbound and southbound traffic on Turner Street.
- Narrow Mechanics Row from Minot Avenue to Main Street and enhance bicycle and pedestrian facilities.

Court Street / Main Street / Great Fall Plaza

This intersection has a turn restriction which prohibits westbound and eastbound left turns. This assists the intersection and operations are LOS C (22 seconds of delay per vehicle) currently and are expected to operate sufficiently in 2025 at LOS C (34 seconds). However, northbound through and right movements are expected to operate poorly. Court Street / Main Street corridor actuation, optimization, and coordination may improve 2025 intersection operations slightly (LOS C, 28 seconds) and improve the northbound through and right movements to acceptable levels. However, the balance between green times for northbound through-right movements versus southbound protected left turns will need adjustment over time.

Public and stakeholder input at the public meetings indicated problems with pedestrian crossing Court Street at this location. One way to improve this crossing would be to remove the westbound channelized yield controlled right turn lane and replace it with a normal signal controlled right turn

lane. This would allow gaps in traffic for pedestrians. Further improvements may include textured or colored crosswalks, improved pedestrian timing, better signage, and other measures which may improve crosswalk and pedestrian visibility. The change from a channelized to a regular right turn is not expected to have major impacts on overall intersection operations.

Summary

- Overall LOS is sufficient and should be in the future with Court Street / Main Street optimization. Further review of northbound through and right movements versus southbound left turn movements may be necessary after optimization.
- Existing westbound channelized yield controlled right turn causes pedestrian issues and could be reconfigured into a standard right turn lane with signal control. Improvement will likely not degrade signal timing.
- Additional pedestrian crossing improvements could be implemented including striped / textured / colored crosswalks, better pedestrian timing, etc. See section 6.1.

5.3. Lewiston Conceptual Improvements

A variety of additional conceptual improvements were studied for the Lewiston portion of the study area as shown in **Figure 5.2**. A summary of these and the rationale is given below.

Main Street / Canal Street / Lisbon Street

This intersection handles one of the greatest amounts of traffic in the study area and is on the Court Street / Main Street primary axis. Intersection operations are complicated by the one-way Canal Street / Lisbon Street pair and spacing, and the long clearance interval times needed as a result. While this intersection currently operates sufficiently at LOS C (29 seconds of delay per vehicle), the year 2025 future forecast is for LOS D (42 seconds) with LOS F turning movements. The first option for this location is the impact of actuation, optimization, and coordination of the Court Street / Main Street corridor. While this will likely improve the operations to LOS C (25 seconds), poor turning movements would still exist in 2025. Simulation results show a reduction in delay from 190 seconds per vehicle to 125 seconds per vehicle, which is still very congested. As a second option, northbound Lisbon Street could be changed from a left and right turn lane, to a left turn lane and a shared left/right lane. This will allow more of the high left turn volumes to get through the intersection each cycle. Applying this improvement and re-optimizing the Court Street/ Main Street corridor would result in increasing LOS to B (15 seconds) in 2025. Simulation results show a reduction to 73 seconds of delay per vehicle in 2025.

This location also may benefit from enhanced pedestrian accommodations, including pedestrian heads and pushbutton actuation.

Summary

- Expected LOS D (42 seconds) in 2025 with poor turning movements
- Court Street/Main Street corridor signal improvements reduce total delay and expected LOS is C (25 seconds) but poor turning movements persist. Simulation delay decreases from expected 190 seconds per vehicle to 125 seconds, which is still poor

- Convert northbound Lisbon from a left / right lane arrangement to a left / left-right arrangement. Resulting LOS is B (15 seconds) with no poor turning movements. Simulation delay decreases to 73 seconds.

Main Street at Park Street

This intersection operates sufficiently now at LOS B (17.9 seconds of delay per vehicle) and is expected to operate poorly in 2025 at LOS E (57 seconds) with poor turning movements. The impact of actuation, optimization, and coordination of the Court Street / Main Street corridor would likely improve the 2025 operations to LOS B (17 seconds).

There are very few crosswalks in this section of Main Street. Review of this intersection showed an opportunity exists to develop a Main Street pedestrian crossing on the western leg. The existence of a wide landscaped island on the western leg of the intersection between the eastbound and westbound Main Street traffic lanes and the signal phasing of the Park Street and Middle Street intersections provides this opportunity. Crossing north to south, the first phase of crossing would be when the exclusive left turn phases at the Main Street / Middle Street intersection are called. The second phase would be when the westbound Main Street to Park Street left turn phase is called.

Summary

- Current intersection operations are sufficient; degradation to LOS E is expected in 2025
- Main Street / Court Street corridor signal improvements would bring 2025 operations to acceptable level
- A two-stage crosswalk on the western leg would improve pedestrian access across Main Street

Main Street at Middle and Bates

The Main Street study area section in Lewiston has six signals, five of which are very close together. In particular, the Park Street, Middle Street, and Bates Street signals are very close. Currently, the Middle Street (LOS B, 19 seconds delay) and Bates Street (LOS C, 32 seconds delay) signals work sufficiently. Simulation shows similar results. However, as traffic grows, operations are expected to deteriorate. In 2025, the Middle Street signal will likely be operating at LOS C (30 seconds) with southbound movements at LOS E and the Bates Street signal likely operating at LOS E (78 seconds) with eastbound and southbound lefts operating poorly.

The first option for improvement at these locations is through the actuation, optimization, and coordination of the Court Street / Main Street corridor. While some overall LOS improvement would be expected, poor turning movements would still exist primarily for the side street movements. The Middle Street intersection would operate at LOS C (20 seconds) and the Bates Street intersection would operate at LOS D (43 seconds), but both would have poor individual turning movements. Simulation results show some improvement with the Middle Street intersection improving from 56 to 51 seconds of delay per vehicle, and the Bates Street intersection improving from 89 seconds of delay to 44 seconds of delay.

A second option would be to ban eastbound left turns at Bates Street and re-route them to Middle Street. Since there is no eastbound left turn lane at Bates Street on Main Street, any vehicles turning

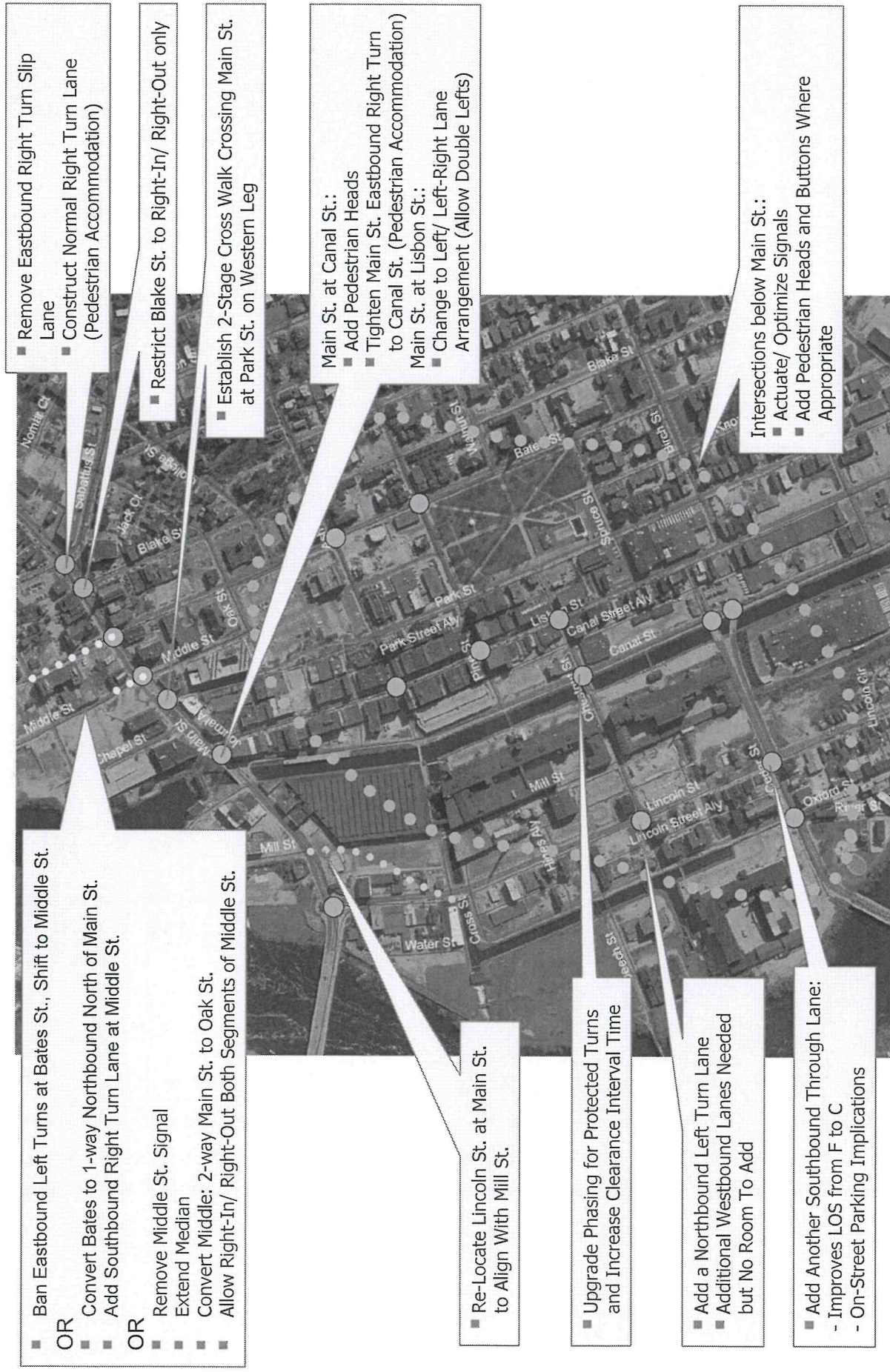


Figure 5.2: Lewiston Conceptual Improvements

left at this location delay the left lane eastbound through traffic. On this busy street, any delay can significantly affect vehicle flow. While operations at the Middle Street signal would remain about the same, LOS C (21 seconds of delay) with poor turning movements, operations at the Bates Street signal would improve to LOS C (32 seconds), but still have poor turning movements. Simulation showed a decrease in delay at the Middle Street to 45 seconds and very little change in the Bates Street intersection (43 seconds).

A third option for these locations is to convert Bates to 1-way northbound north of Main Street, and re-route southbound left and right turns from Bates Street to the Middle Street intersection. The advantage of this approach is to change the Bates Street signal from side street split phasing to single side street phasing which would allow for longer Main Street green times. Re-optimization of the Court Street / Main Street corridor would also be included. Initial review of this option showed improvements for the Bates Street intersection from LOS D (43 seconds) in 2025 with poor individual turning movements to LOS B (11 seconds). However, the Middle Street intersection deteriorated from LOS C (20 seconds) to LOS E (76 seconds) in the 2025 scenario, both with poor individual turning movements.

Based on results of the above analysis, a southbound right turn lane was added at the Middle Street intersection, the Main Street / Court Street corridor was re-optimized, and the intersections analyzed again. The Bates Street intersection worsened slightly to LOS B (14 seconds) but the Middle Street intersection improved to LOS C (21 seconds). Simulation showed improvements for the Bates Street intersection from 89 seconds of delay per vehicle for 2025 traffic without improvements to 44 seconds with Court Street/ Main Street corridor signal improvements, to 25 seconds with this option. However, the Middle Street intersection showed 56 seconds of delay without improvements for 2025, 51 seconds of delay with the Court Street/ Main Street corridor signal improvements, and 95 seconds of delay with this option. (This option was further tested with eastbound left turns at Bates Street re-routed to Middle Street similar to the first option. The additional traffic at Middle Street worsened traffic operations somewhat at both intersections and for the overall network and thus this change was not included.)

Ultimately, the suggested improvements help the Bates Street intersection without harming the Middle Street intersection. While the overall simulation results are better for the entire network, further evaluation of this option may be warranted. The necessary space needed to add the southbound right turn lane on Middle Street would likely need further analysis since a parking lot and sidewalk border this section of the street.

A fourth option for these locations is to remove the Middle Street signal, extend the median on Main Street to close the intersection, allow Middle Street to operate 2-way between Main Street and Oak Street, and allow right turn in/out operation for both segments of Middle Street north and south of Main Street. However, this approach would likely force eastbound Main Street left turn traffic to the Main Street / Bates Street intersection. As noted above, this intersection has no left turn lane and expansion to add a left turn lane is very unlikely due to right-of-way issues. Consequently, the queuing for the left turns re-located from the Middle Street intersection would likely block a significant amount of through traffic worsening overall traffic operations along Main Street.

Summary

- Distance between Park Street, Middle Street, and Bates Street signals very short with high traffic volumes

Table 5.3 Middle Street and Bates Street Estimated Level of Service, HCS Delay, and Simulation Delay for Options Tested, Year 2025 Traffic

Scenario	Middle Street		Bates Street	
	LOS	Simulation	LOS	Simulation
No Improvements	C* (30)	56	E* (78)	89
1) Main Street/Court Street Actuation, Optimization, and Coordination	C* (20)	51	D* (43)	44
2) Ban eastbound lefts at Bates Street – shift to Middle Street, re-optimize	C* (21)	45	C* (32)	43
3) Bates one-way northbound north of Main Street, re-route traffic to southbound Middle Street, add Middle Street right turn lane	C (21)	95	B (14)	25

Source: Wilbur Smith Associates

- Option 1: Actuation, optimization, and coordination of the Court Street / Main Street corridor improves delay but leaves poor individual movement operations
- Option 2: Ban eastbound lefts at Bates Street and re-route to Middle Street, re-optimize Court Street / Main Street corridor signals. Marginally improves intersection operations at both intersections but both still have poor individual side-street movements
- Option 3: Make Bates Street one-way northbound north of Main Street and re-route southbound traffic through Middle Street. Necessary to add a southbound right turn lane at Middle Street and this may or may not be possible based on right of way. Re-optimize Court Street / Main Street corridor. Both locations improve to acceptable levels. However simulation results for the intersections were mixed while overall study area operations improved.
- Option 4: Remove Middle Street signal, extend the median on Main Street to close the intersection, allow Middle Street to operate 2-way between Main Street and Oak Street, and allow right turn in/out operation for both segments of Middle Street north and south of Main Street. This may allow better signal progression along the Main Street / Court Street corridor but re-located eastbound left turns may block mainline traffic worsening operations. Further testing and engineering evaluation would be needed.

Main Street / Blake Street

The Blake Street and Main Street intersection is located very close to the Sabattus Street and Main Street intersection and thus movements to and from Blake Street and Main Street are difficult. Given the availability of other roadways to handle these movements, it is recommended Blake Street be restricted to right turn in / right turn out at Main Street. This restriction should be helpful in removing additional movements from the Sabattus Street / Main Street intersection area. Physical enforcement of this restriction through traffic island channeling would likely be necessary.

Main Street / Sabattus Street

This intersection operates well currently with LOS B (16 seconds of delay per vehicle) and will likely operate well for year 2025 forecasted traffic with LOS B (19 seconds). The eastbound right turns at this location use a large, dedicated yield controlled right turn lane. In order to better accommodate pedestrians, it is recommended this lane be removed and a standard eastbound right turn signal controlled lane be added.

Main Street / Lincoln Street / Mill Street / Island Point

Currently, the intersection of Main Street and Lincoln Street operates well with LOS B (15 seconds of delay) and is expected to operate well in 2025 with LOS C (26 seconds). However, a major redevelopment is expected at Island Point. The redevelopment includes proposals for access just west of the Canal and opposite Mill Street on Main Street. It is likely a signalized intersection will be requested at one or both of these locations, further complicating Court Street / Main Street traffic operations. As an alternative, it may be possible to re-route Lincoln Street south of Main Street so that it aligns with Mill Street at Main Street. Then, the current Lincoln Street signal could be removed and a signal at Mill Street / Island Point added. In this way no new signals are added to the Court Street / Main Street corridor and signalized control would be available for the Island Point project. Feasibility and operational analysis of this alternative would be needed given right-of-way issues, grade differences, future traffic generators, and other ongoing area redevelopment.

Chestnut Street / Canal Street

Operationally, this intersection works well currently at LOS B (14 seconds delay) and is forecast to operate well at LOS D (41 seconds) in 2025 but with poor westbound left turn operations. However, a large number of accidents were noted at this location. Crash analysis determined angle collisions involving westbound left turn movements were frequent. Thus, it is recommended the phasing at this location be upgraded to include a westbound left turn protected phase, as well as increasing interval clearance time in the signal timing. With the addition of this protected left turn phasing and actuation and optimization of the signal, year 2025 operations are forecast to improve from LOS D (41 seconds) with individual poor turning movements to LOS C (20 seconds) with no poor turning movements. Simulation of the intersection showed an increase in 2025 delay from 12 seconds per vehicle to 19 seconds; however the delay is still acceptable.

Lincoln Street and Cedar Street

This intersection handles a lot of the traffic using the Canal Bridge and the South Bridge connection. Traffic volumes are forecasted to increase 43% from 2005 to 2025 with the addition of the turnpike interchanges. Currently, the intersection operates at LOS C (26 seconds of delay per vehicle) and will likely worsen to F (137 seconds) without improvements in 2025. The first option for this intersection is to optimize the signal and make sure the actuation is working properly. While this would reduce the delay somewhat, it does not change the overall LOS. The second option is the addition of a second southbound through lane which would likely improve the 2025 LOS to C (31 seconds). Simulation of the intersection showed similar results with 2025 delay decreasing from 230 seconds in the current configuration, to 218 seconds with optimization, to 45 seconds with an additional southbound lane and optimization.

The addition of the southbound lane is likely possible. However, some on-street parking may be lost.

Summary

- Large impact to intersection in 2025 with new turnpike interchanges. Level of Service degraded from C (26 seconds) in 2005 to F (137 seconds) in 2025
- Optimization would have little effect on overall LOS
- Addition of second southbound through lane improves LOS to C (31 seconds) as well as micro-simulation delay from 230 seconds without improvements to 45 seconds with improvement.
- Addition of second southbound lane may be possible within current Right of Way, but some on-street parking will likely be lost.

Lincoln Street / Chestnut Street

The intersection of Lincoln Street and Chestnut Street also handles some cross-town traffic since it provides one of the only eastbound connections from South Bridge and western downtown Lewiston across the Canal to downtown Lewiston. Currently, the intersection operates at LOS B (18 seconds of delay). However, in 2025 with the growth of traffic and the addition of the turnpike interchanges, the traffic at this intersection is estimated to increase 54%. The operations are estimated to drop to LOS F (162 seconds). The first option for this location is to actuate and optimize the signal and add a northbound left turn lane, which would decrease the delay to 105 seconds, but still LOS F. (The northbound left turn lane would likely be easy to implement given the pavement width on the approach.) Simulation delay would also improve dropping from the expected 70 seconds of delay without improvements to 34 seconds of delay with improvements.

The intersection / operations analysis showed expanding the westbound approach from one lane to a through / right lane and a left turn lane is needed. Although this option would improve LOS to B (16 seconds) and bring down simulation delay to 16 seconds, there is no room available to widen the approach due to the buildings on either side of the street.

Summary

- Intersection heavily impacted by growth and turnpike scenario
- Add northbound left turn lane, Actuation, Optimization. Decrease in expected delay from 162 seconds per vehicle to 105 seconds, but still LOS F. Simulation delay drops from 70 seconds per vehicle without improvements to 34 seconds with improvements
- Add westbound left turn lane. While this option would improve LOS to B (16 seconds) and 16 seconds of simulation delay, there is no room for this improvement

One-Way to Two-Way Street Conversion

For many years, downtown Lewiston's street network has included a one-way system. This system was developed to help circulate traffic and improve intersection operations. However, with changes in traffic volumes and in trip making patterns, this system needs re-evaluation. As part of this study, the system was examined in the field to see which streets might be returned to two-way operation.

Also, the regional transportation model was used to generate expected trips should certain street segments be converted to two-way operation. This information was then studied using the Synchro model built for the project and the Level of Service reviewed for impacted study area locations.

Figure 5.3 shows the existing and conceptual street system with one-way to two-way conversion. Each of the streets with this conversion are described below including discussion of why other one-way street segments are not included for conversion.

- **Main Street Lewiston** – The system of one-way streets that accesses Main Street from the North and South helps reduce turning movements to and from Main Street, simplifying Main Street signal operations and facilitating the flow of the large volumes of through traffic on Main Street. Also certain streets, such as Canal Street and Lisbon Street, are not suited for two way operations due to their narrow layout. Consequently, it is not possible to convert one-way sections which adjoin Main Street except as noted earlier in this report.
- **Middle Street south of Main Street** – As noted in the analysis of the Middle Street signal in section 5.3, if the Middle Street signal were eliminated and Main Street median extended, Middle Street north and south of Main Street could have two-way operation with right-turn-in / right-turn-out traffic patterns accessing Main Street. However, the relocation of eastbound left turns to the Bates Street / Main Street intersection may be problematic due to a lack of left turn lane space.
- **Ash Street** – Ash Street, currently operating one-way westbound from Sabattus Street to Canal Street could be converted to two-way operation from Lisbon Street to Jefferson Street. There is sufficient width currently to accommodate this type of operation, but considerations such as snow plowing and on-street parking should be reviewed. Between Canal Street and Lisbon Street there is sufficient width on Ash Street to allow two-way travel, but the parking garage at Ash Street and Canal Street has been configured based on the current one-way westbound operations. It is possible that the entrance to the garage could be reconfigured and this section of Ash Street could also be two-way. Between Jefferson Street and Sabattus Street, Ash Street will need to remain one-way away from Sabattus Street to accommodate complicated signal operations at the five-way intersection of Sabattus Street, Central Avenue, Webster Street, and Ash Street.
- **Pine Street** - Pine Street, currently operating one-way eastbound from Canal Street to Sabattus Street could be converted to two-way operation from Canal Street to Webster Street. There is sufficient width currently to accommodate this type of operation, but considerations such as snow plowing and on-street parking should be reviewed. Between Park Street and Bates Street, parking would likely need to be reconfigured to parallel parking on both sides of Pine Street from the current angle parking on one-side and the curb line realigned with the Pine Street cross section to the east. Between Webster Street and Sabattus Street, Pine Street narrows significantly and additional field review would be needed to determine if the two-way operation can be extended to Sabattus Street.
- **Canal Street** – Canal Street currently operates one-way southbound from Main Street to Lisbon Street. It could be converted to two-way operation north from Locust Street to Pine Street. There is sufficient width currently to accommodate this type of operation, but

considerations such as snow plowing and on-street parking should be reviewed. Canal Street between Main Street and Ash Street would need to remain one-way southbound due to a narrow street cross-section and the difficulty of maintaining high traffic volume throughput at the Main Street / Canal Street / Lisbon Street intersection while still servicing the northbound Canal Street traffic resulting from two-way operation on this segment. Canal Street between Ash Street and Pine Street would need to remain one-way southbound unless the access to the parking garage on Canal Street between Ash Street and Pine Street can be resolved.

At the southern end, it may be possible to extend Canal Street two-way operations to Lisbon Street. The intersection of Lisbon Street and Canal Street would need further study to see if safe and efficient traffic operations can be achieved. One option for this location might be a roundabout. (Operations and layout for a roundabout at this location would need further study and design review, including determining if traffic volumes will be sufficiently balanced to provide good roundabout operations.) Otherwise, traffic heading north on Lisbon Street that wants to access Canal Street northbound could turn left at Locust Street (which will also need to be converted to two-way operation between Canal Street and Lisbon Street) and turn right on Canal Street.

- **Lisbon Street** – Lisbon Street currently operates one-way northbound from Canal Street to Main Street. It could be converted to two-way operation from Cedar Street south to Canal Street. There is sufficient width currently to accommodate this type of operation, but considerations such as snow plowing and on-street parking should be reviewed as well as access to area businesses such as the bakery. As mentioned above, a roundabout at Lisbon Street and Canal Street (south) may allow two-way operations on both streets. Lisbon Street north of Cedar Street is narrow to accommodate on-street parking for the Lisbon Street commercial district and thus conversion to two-way is not practical.
- **Cedar Street** – Cedar Street currently operates one-way westbound from Lisbon Street to Canal Street. This restriction, the split bridge of Cedar Street over the Canal, and the other one-way street segments in the area, keep traffic crossing the Cedar Street bridge from accessing downtown Lewiston without heading south on Canal Street and using Maple Street to access Lisbon Street. By reconstructing the Cedar Street bridge for two-way operations and allowing two-way operation from Canal Street to Lisbon Street, direct access to downtown from west of the Canal is possible. One of the considerations for this conversion is the narrow intersection of Cedar Street and Lisbon Street which may be an issue for turning trucks if Cedar Street is made two-way.
- **Park Street** – Park Street currently operates one-way southbound from Main Street to Spruce Street. It could be converted to two-way operation from Oak Street to Spruce Street. There is sufficient width currently to accommodate this type of operation, but considerations such as snow plowing and on-street parking should be reviewed. The segment of Park Street from Main Street to Oak Street would likely need to remain one-way to accommodate simplified operations at the Park Street / Main Street signal which accommodates high traffic demand on Main Street.

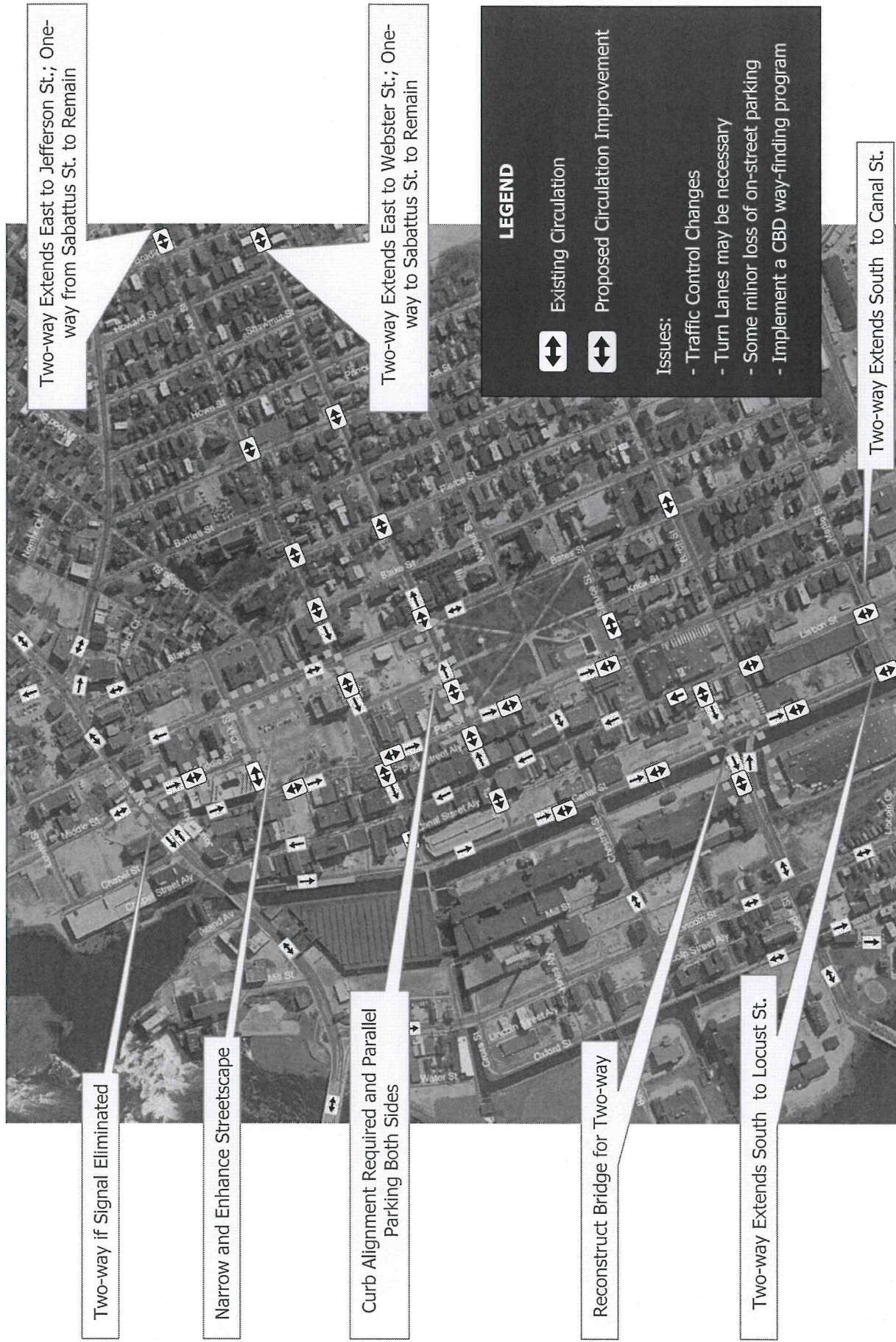


Figure 5.3: Lewiston One-way to Two-way Conversion

- Bates Street – Bates Street operates one-way northbound from Oak Street to Main Street. Again, due to the complication of the Main Street / Bates Street signal operations, it is likely not possible to convert this segment to two-way operation. However, field review showed Bates Street from Oak Street to Ash Street is very wide. This street segment is used as a bus station and also to access a fire station. This segment could be reconfigured to accommodate these uses while providing better pedestrian accommodations and landscaping so that this block will blend with the rest of the downtown area.

A review of the ATRC travel demand model was conducted to determine changes in traffic volumes on key roadway segments following conversion of the one-way system. A summary of the 2025 PM Peak hour volumes is provided below:

- Ash Street north of Bates
 - One-Way – 1030 vehicles
 - Two Way – 740 vehicles
- Pine Street north of Bates
 - One-Way – 480 vehicles
 - Two-Way – 830 vehicles
- Lisbon Street near Main Street
 - One-Way – 890 vehicles
 - Two-Way – 830 vehicles
- Main Street near Sabattus Street
 - One-Way – 3080 vehicles
 - Two-Way – 2950 vehicles
- Park Street between Pine Street and Ash Street
 - One-Way – 160 vehicles
 - Two-Way – 530 vehicles

An evaluation of some of the key internal CBD intersections were evaluated under two-way circulation for the future 2025 traffic volume conditions. Results indicate that the Lisbon Street/Pine Street and Bates/Ash Street intersections would operate at acceptable levels of service in the future. The Bates Street/Pine Street intersection is projected to operate at a level of service D overall, but is expected to have some movements that fail. To attain acceptable levels of service, two approach lanes would be required on northbound Pine Street, thus requiring some loss of on-street parking.

Travel within Downtown Lewiston can be confusing and accessibility is generally difficult due to the one-way circulation system. Implementation of a two-way circulation system may help to improve accessibility. Based upon the evaluation conducted for this study, conversion of some CBD streets to two-way is possible. However, this study provides only part of the analysis needed to move forward with the conversion. At this time, conversion to a two-way system is not suggested without further feasibility analysis and planning. These should include a cost-benefit analysis and a public

and business perception survey. Furthermore, a detailed design and implementation study would be needed that fully explores elements of the roadway conversions, including traffic control changes, winter maintenance, phasing (what streets are converted first), parking impacts, and a public/business outreach program.

Wayfinding

While the suggested improvements and two-way street operations will assist drivers in circulating through and accessing the downtown Lewiston area, difficulties will likely remain for those unfamiliar with the area. In particular, the necessity of keeping several segments around Main Street and also a major portion of Lisbon Street in Lewiston one-way; the limited number of Canal and Androscoggin River crossings; and the limited turning movements on Court Street in Auburn may continue to confuse drivers. Consequently, a wayfinding system should likely be developed coordinated between both cities. Key aspects of this system would show the best routes to cross the River and Canal, show how to re-circulate through both downtowns, give directions to major destinations, and provide parking information.

6. Additional Pedestrian Improvements

Field review of the study area showed there were places where additional pedestrian enhancements would be useful. These enhancements include:

- Re-evaluation of existing pedestrian signals and phasing for proper equipment and crossing times
- Pedestrian heads, phasing, and actuation at all downtown intersections
- Well marked and textured pavement crosswalks at key locations
- Narrowing or pedestrian refuges where crossing length is long
- Handicapped accessible ramps at all crosswalk locations with detectable warning strips for the visually impaired (truncated domes).

6.1. Pedestrian Improvements – Auburn

Based on public meeting and stakeholder input, conceptual pedestrian improvements for downtown Auburn were developed as shown in **Figure 6.1**. These are in addition to the general recommendations above.

Main Street/Great Falls Plaza Road at Court Street Intersection

This intersection serves as an important gateway into the City of Auburn. The Androscoggin River Greenway trail crosses at this location. Recommended improvements are designed to minimize crossing distances where possible and make new crosswalks more visible such as by installing thermoplastic crosswalk markings.

Across Court Street, east side of intersection:

- Install high visibility crosswalk treatment
- Consider LED in-pavement lighting to accentuate pedestrian crossing, activated during pedestrian phase



Southeast Corner:

- Add new pedestal for pedestrian pushbutton, pedestrian signal head and countdown timer for the crossing of Main Street
- Move curb line of Court Street/bridge approach to match curb line on Court Street west of Main Street to 1) reduce crossing distance and 2) create decorative esplanade of 5' to 6' in width, matching in to existing curb location just prior to bridge
- Carry design treatments from intersection to the trail terminus on south side of Longley Bridge
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance
- Install signs indicating trail locations / directions

Northeast Corner:

- Eliminate slip lane and pedestrian island to create a standard right turn lane (minimize turning radius of new corner but ensure that it accommodates right turns by City buses; larger trucks should continue to Turner Street to access Great Falls Plaza)
- Add new pedestal for pedestrian pushbuttons (2), pedestrian signals (2) and countdown timers (2) for crossing of Court Street and Great Falls Plaza
- Move curb line of bridge/Court Street approach to match curb line on Court Street west of Main Street to 1) reduce crossing distance and 2) create decorative esplanade of 5' to 6' in width, matching in to existing curb location just prior to bridge
- Carry design treatments east to Androscoggin River Greenway trail
- Install signs indicating trail locations / directions
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance

Southwest Corner:

- Reduce turn radius (most traffic should use Mechanics Row to access this section; trucks in particular should always use Mechanics Row; only two trucks eastbound on Court Street turned right to southbound Main Street in the entire three hour afternoon traffic count conducted for this study; no trucks turned right during the peak hour; and total 2025 forecasted peak hour traffic making this turn is only 15 total vehicles of which zero to one is expected to be a truck.)
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance
- Add countdown timers (2) to pedestrian signals.

Northwest Corner:

- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance
- Add countdown timers (2) to pedestrian signals.

Turner Street/Mechanics Row at Court Street Intersection

This intersection suffers from large crossing distances with pedestrians crossing against heavy turning traffic. Pedestrian phases are concurrent with traffic phases. A “No Right Turn on Red” sign activated by the Court Street crosswalk phase could be installed on the mast arm governing right turns from westbound Court Street onto northbound Turner Street.

Southeast Corner:

- Add leading pedestrian phase of 4 seconds to the pedestrian phase activated by this button. (This will allow pedestrians a head start crossing Court Street and reduce conflicts with the heavy left turning traffic from Turner Street.)
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance
- For Court Street pedestrian pushbutton, signal phase to activate “No Right Turn on Red” sign for westbound Court Street traffic.

Northeast Corner:

- Add leading pedestrian phase of 4 seconds to the pedestrian phase activated by this button. (This will allow pedestrians a head start crossing Court Street and reduce conflicts with the heavy left turning traffic from Turner Street.)
- Minimize corner radius of curb alignment of new exclusive right turn lane (see earlier conceptual improvements at this location) on Court Street westbound to minimize crossing distances
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance
- For Court Street pedestrian pushbutton, signal phase to activate “No Right Turn on Red” sign for westbound Court Street traffic.

Southwest Corner:

- Extend curb/reduce corner radius at Mechanics Row to minimize crossing distance
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance

Northwest Corner:

- Extend curb/reduce corner radius at Turner Street/Court Street intersection to minimize crossing distance and expand sidewalk area to 5' of width minimum (currently the width is deficient).
- Install two curb ramps, aligned with crosswalks, with detectable warning strips/truncated domes for ADA compliance

Along Mechanics Row

Move curblines to establish 5'-6' treed esplanade along the existing sidewalk. Sight distances for driveways accessing Auburn Hall's back side area and parking garage must be taken into consideration when establishing plantings in this area.

Turner Street from Court Street to beyond Mid-Block Crosswalk

- Remove one northbound lane from Court Street to mid-block crosswalk
- Move west side parallel parking to east side
- Create southbound bike lane on west side
- Re-define mid-block crosswalk with pavement treatment and curb extensions to limit crossing distance
- Adjust median accordingly
- Additional options:
 - Create northbound bike lane on east side of Turner Street

OR

- Widen median to allow for pedestrian refuge at north leg crosswalk of Court Street / Turner Street intersection and at mid-block crosswalk and create northbound bike lane on Great Falls Plaza east side

6.2. Pedestrian Improvements – Lewiston

Based on field reconnaissance and observation of pedestrian issues in Lewiston, the following specific conceptual improvements were developed. These are in addition to the general recommendations given at the beginning of Section 6.

Main Street at Canal Street

Southwest Corner

- Add pedestrian heads and buttons to complete pedestrian actuation
- Tighten eastbound Main Street right turn to Canal Street to slow traffic and narrow pedestrian crossing length
- Add signal stop control to eastbound right turns during actuated pedestrian crossing phase

Main Street and Park Street

- Establish two-stage cross walk on western leg crossing Main Street with pedestrian phase actuation and pedestrian heads.

Main Street and Sabattus Street

- Remove eastbound Main Street right turn channelized island
- Construct regular signal controlled right turn lane with stop control during actuated pedestrian crossing phase

Main Street Corridor

- Install pedestrian countdown timers

7. Socio-Economic Basis for Forecasts

The Lewiston and Auburn downtowns are undergoing dramatic change. This is evident in the widespread revitalization of areas through rehabilitation of existing buildings for retail and office uses as well as new construction of multistory office and retail buildings. Along with this construction comes new surface and structured parking to accommodate commuters and shoppers to the downtown. The amount of this growth in the downtowns has a large impact on the forecasts of future demand for travel to and from the study area, the downtowns. These trips have one or both ends of a trip beginning or ending within the study area. Another portion of traffic has neither the beginning nor the end of a trip within the study area but passes through the study area. **Table 7.1** shows the amount of growth in the study area for the years for which traffic analyses were conducted: 2005, 2015, and 2025.

Table 7.1
Population, Household and Employment and Percentage Growth
Lewiston-Auburn CBD Study Areas: 2005, 2015 and 2025

Auburn	Population	House-	Retail	Non-	Population	House-	Retail	Non-
	2005	holds	2005	Retail	'05-'15	holds	'05-'15	'05-'15
	3451	1651	846	2964	2.0%	-0.75%	11.5%	20.0%
	Population	House-	Retail	Non-	Population	House-	Retail	Non-
	'05-'25	holds	'05-'25	'05-'25	'05-'25	holds	'05-'25	'05-'25
	4.0%	-1.0%	23.5%	40.5%				
Lewiston	Population	House-	Retail	Non-	Population	House-	Retail	Non-
	2005	holds	2005	Retail	'05-'15	holds	'05-'15	'05-'15
	7364	3846	762	7524	2.0%	-5.0%	9.0%	15.0%
	Population	House-	Retail	Non-	Population	House-	Retail	Non-
	'05-'25	holds	'05-'25	'05-'25	'05-'25	holds	'05-'25	'05-'25
	4.0%	-9.5%	20.0%	30.0%				

Pop.=Population; HH=Households; Non-Ret=Non-Retail.
Source: ATRC Travel Demand Model.

Within the Auburn portion of the study area, there is modest growth forecasted for population of 2% for the ten year period 2005 to 2015; the forecasted growth over the twenty year period to 2025 is 4%, or approximately 150 persons. Households are forecast to decline over this same twenty year period by approximately 1%, or 16 households.

Retail employment is forecasted to grow by 11.5% from 2005 to 2015 while Non-Retail employment is forecast to grow by 20%. These trends are expected to continue for the 2005 to 2025 period, with Retail growth of 23.5% and Non-Retail growth of 40.5%. This translates to growth of approximately 200 Retail jobs and 1200 Non-Retail jobs during the twenty year period.

In Lewiston, similar trends are anticipated. There is modest growth forecasted for population of 2% for the ten year period 2005 to 2015; the forecasted growth over the twenty year period to 2025 is

4%, or approximately 300 persons. Households are forecast to decline over this same twenty year period by approximately 9%, or 360 households. This indicates that household sizes will decline moderately over the next 20 years.

Retail employment is forecasted to grow by 9% from 2005 to 2015 while Non-Retail employment is forecast to grow by 15%. These growth trends are expected to continue over the 2005 to 2025 period, with Retail growth of 20% and Non-Retail growth of 30%. This translates to growth of approximately 150 Retail jobs and 2200 Non-Retail jobs during the twenty year period.

Appendix

- Level of Service Detailed Results
- June 2005 Public Meeting Summary Figure and Text
- June 2005 Public Meeting Attendance Lists
- April 2006 Public Meeting Summaries

Table A1
Auburn Intersection Level of Service Details
Current Configuration

Intersection	2005			2015			2025		
	LOS	Delay	Poor Movements	LOS	Delay	Poor Movements	LOS	Delay	Poor Movements
Minot Avenue/High St.	B	14.8		B	16.9		B	17.1	
Minot Avenue/Elm St.	B	14.6		B	16.3		B	16.4	
Minot Avenue/Union St. By-Pass /Court St.	D	40.1	WBL LOS E	D	49.6	EBL, WBL, WBTR, NBL all LOS E or F	E	56.6	EBL, WBL, WBTR, NBL and SBL all LOS E or F
Union St. By-Pass /Hampshire St.	B	12.6		B	13.9		B	15.6	
Union St. By-Pass / Center St. /Turner St.	F	87.8	EBL, NBL, SBTR, SBR, SEL all LOS F	F	119.8	EBL, NBL, SBTR, SBR, SEL all LOS F	F	156.4	EBL, NBL, SBTR, SBR, SEL all LOS F
Court St./Spring St.	B	14.2		B	20		C	23.6	
Court St./Turner St. / Mechanics Row	C	26	SBTR LOS E	D	48.5	WBLTR LOS E, SBTR LOS F	E	76.3	WBLTR LOS F, SBTR LOS F
Court St./Main St./ Great Falls Plaza	C	22.4		C	28.3	NBTR LOS E	C	34.2	NBTR LOS F
Main St./Academy St.	C	33.8	NBL LOS E	E	64.6	NBL LOS F, SBT LOS E	F	85.8	NBL LOS F, SBT LOS F
Main St./Mill St./ South Main St.	C	20.2		C	22.3		C	26.1	
Mill St./Broad St.	C	26.4	WBLT LOS E	C	29.2	WBLT LOS F	C	33.6	WBLT LOS F
Riverside Drive/Broad St. (Unsignalized)	F	168.7	NW approach	F	340.4	NW approach	F	632.3	NW approach

Key: EB=Eastbound, WB=Westbound, NB=Northbound, SB=Southbound, NW=Northwestbound, SE = Southwestbound
L=Left, T=Through, R=Right
Source: Wilbur Smith Associates

Table A2
Lewiston Intersection Level of Service Details
Current Configuration

Intersection	2005			2015			2025		
	LOS	Delay	Poor Movements	LOS	Delay	Poor Movements	LOS	Delay	Poor Movements
Main St./Lincoln St.	B	15		B	17.5		C	26	
Main St./Lisbon St./Canal St.	C	28.7	NWL LOSE	C	34.7	NWL LOSE F	D	41.5	NWL LOSE F
Main St./Park St.	B	17.9		C	29.4		E	56.9	SWL and SWT LOSE
Main St./Middle St.	B	18.5		C	22.2		C	29.6	SBLTR LOSE
Main St./Bates St.	C	32.3		D	46.4	NELT LOSE	E	78.2	SBL LOSE, NELT LOSE F
Main St./Sabattus St./Hammond St.	B	15.7		B	17.3		B	18.9	
Lisbon St./Ash St.	B	14.3		B	16		B	18	
Lisbon St./Pine St.	A	9.7		B	10.2		B	10.6	
Lisbon St./Chestnut St.	B	14.5		B	15.4		B	19.2	
Bates St. / Ash St.	A	8.3		A	8.8		A	9.4	
Bates St./Pine St.	B	12.8		B	13.4		B	13.6	
Canal St./Chestnut St.	B	13.5		B	14.8		D	40.8	WBLT LOSE F
Canal St./Cedar St. (North)	B	11.8		B	11.9		B	12.3	
Canal St./Cedar St. (South)	B	10.4		B	10.6		B	10.7	
Lincoln St./Chestnut St.	B	18.2		C	21.5		F	161.8	WBLTR LOSE F
Lincoln St./Cedar St.	C	25.6		D	38.4	EBLTR LOSE	F	136.6	EBLTR, WBLTR, NBL, SBTR ALL LOSE OR F
Oxford St./Cedar St.	A	6.4		A	7.1		A	8.3	

Key: EB=Eastbound, WB=Westbound, NB=Northbound, SB=Southbound, NW=Northwestbound, SE = Southwestbound
L=Left, T=Through, R=Right
Source: Wilbur Smith Associates

June 2005 Public Meeting Summary Map - Issues Identified
(See Figure A.1)

Site Specific (numbered, color coded dots):

1. Court St. @ Turner St. Auburn
 - Eliminate RTL from Court to Turner causing problems
 - Running Red Lights (use of strobes?)
 - Balance traffic operation/pedestrian
2. College @ Russell, Lewiston,
 - need signal between?
 - LT signal
3. Russell @ Sabattus, Lewiston
 - Look at design
4. Chestnut @ Canal, Lewiston
 - Can't make left onto Canal
 - Room for exclusive left turn lane
5. Minot @ Washington in Auburn
 - Dangerous merge
6. Main to Park left turn
 - Flashing at night; just sit there
 - is a long cycle
7. Dunkin Donuts (@ 319 Main St, Lewiston)
 - Pedestrian nightmare to cross street
 - Parking garage behind Dunkin Donuts: CMMC parking
 - Lisbon at Main – access to Dunkin Donuts (Is DD at this location?)
 - DD to Oak St. Connection is a grade issue
 - Dunkin Donuts Queue
8. Main St. NB @ Bates, Lewiston
 - Left onto Bates a problem
 - Hammond St. is better
9. Horton @ Birch, Lewiston is dangerous
10. Bartlett @ Birch, Lewiston is dangerous
11. Blake @ Birch, Lewiston: speeds, running stop signs, trucks and volumes
12. Cedar @ Lincoln, Lewiston
 - used to get leading left from Auburn onto Lincoln; new signals, new phases
13. East Ave. @ Bartlett
 - left turn signal
14. Main @ Strawberry Ave, Lewiston: Signal needed?
15. Union @ Court, Auburn -Long cycle length
16. Court @ Main, Auburn- Balance traffic operation/pedestrian
18. Lincoln @ Chestnut St, Lewiston- Need to move truck entrance
19. Elm @ Minot, Auburn- Improve truck movement
20. Elm @ Main, Auburn- Improve truck movement
21. Union/Center @ Turner, Auburn

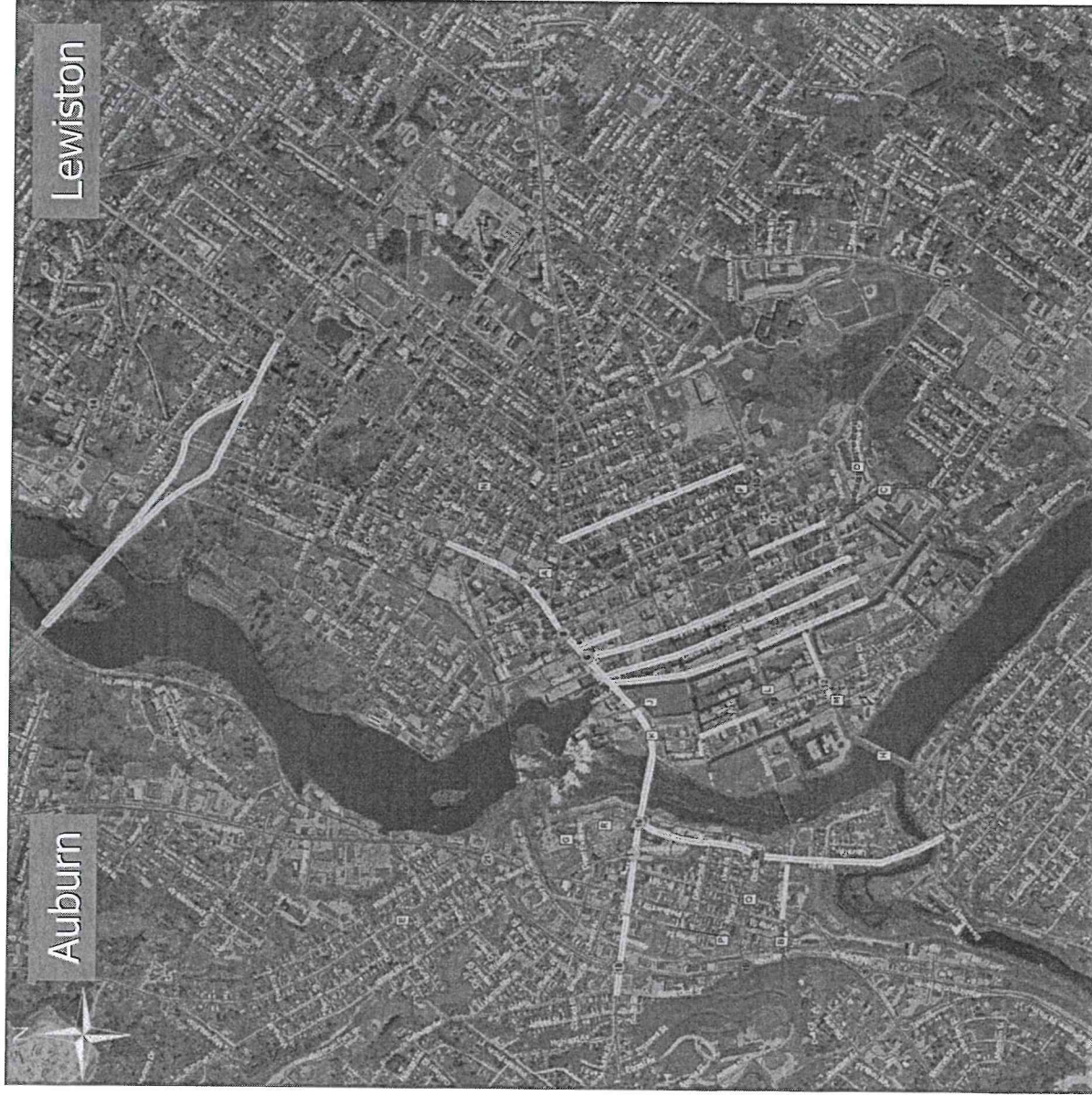


Figure A.1: 2005 Public Meeting Summary Map

FINAL REPORT

August 30, 2007

Lewiston/Auburn Downtown Central Business District Traffic Study

- Alignment
- Long delays
- improve efficiency

Road Segments: (alpha-labeled, color coded line segments)

New Connector Options:

- A) Bartlett direct to Main St.-elevated over Sabattus
- B) Academy St, Auburn-. Possible extension to Minot
- C) Lisbon to Bates, Lewiston
- D) Pleasant St to Bates, Lewiston

Road Segment Suggestions & Comments:

- E) Turner St, Auburn. North of Union/Center: Bike path lane, access downtown to mall
- F) Bartlett St, Lewiston: Residential Impacts
- G) At Great Falls Plaza, Auburn: parking area needs to be redesigned
- H) South Bridge- Under utilized; 2-3 lanes section - add bike lanes?

Pedestrian Suggestions & Comments:

- J) Over/under at Main; Island Point to Convention Center
- K) Lincoln @ Main, Lewiston –crosswalk issues: sight distance issues, speeds, access from Lincoln to Island Point
- L) Chestnut St, Lewiston: Pedestrian priority
- M) Cedar St, Lewiston: Pedestrian crossing
- N) College St, Lewiston: Pedestrian corridor
- P) Spring St, Auburn – Pedestrian priority
- Q) Elm St, Auburn – Pedestrian priority
- R) Great Falls Plaza, Auburn: Between Turner & Court, Cut through traffic-should be pedestrian priority

Issues Identified - Corridors (Yellow highlighted segments):

- *Veteran's Bridge Area
 - # of lanes from Veterans Bridge (1 lane);
 - Veterans Bridge merge at Russell is dangerous; Need 'Stay in Lane' signs
 - Use of Veteran's Bridge with overpasses – diversion
- *Main St, Lewiston.
 - NB: too many phases
 - between Sabattus and High, dropped lane: on vs. off street parking
 - Signals – Not coordinated
- *Horton St, Lewiston: Street lights on Horton, Flash mode
- *Middle Street, Park St., Canal and Lisbon
 - Look at one-way; Reverse direction; Two way; Evaluate direction
- *Park St. – Crosswalks by garage; no one stops for pedestrians in crosswalks
- *Lisbon-one-way south; Main to Pine, reverse direction, to make, too much thru
- *Lisbon between Pine & Chestnut
 - Parking – 1 hour, not enforced; difficult to get customer turnover at 247 Lisbon
 - Store @ corner of Chestnut & Lisbon moves vehicle every hour to avoid ticket
- *Court St, Auburn.-Heavy traffic now, will increase with development
- *Main St, Auburn
 - speeds
 - Between Mechanics Row and Court St-1 Way; Landscaping; Traffic Calming?
 - @ Mechanics Row- Roundabout-not a good idea

Other Comments not shown on map

Pedestrian

- Franklin Pasture to RR Park
- Coliseum
- Hub at Convention Center
- Park and Walk
- Noted on Map: Area between Lisbon/Pine/Bates/Birch: Peds
- Andover College – Pedestrian crossing problems
- Lisbon St. @ Getty Mart – Crosswalks: 2 lanes; 1 stops, 1 does not
- Pedestrian islands work on major streets (Auburn)

Rail

- Connect to Lower Lewiston
- Pineland/Portland/Lewiston
- Ocean Gateway
- Libra Foundation
- Connect to Metro
- Auburn Intermodal
- “Destination”
- Lisbon/Brunswick/Bath
- “Shared” Car System

Unspecified issues or locations & general suggestions:

- Sabattus and Main
 - Mt. Auburn at Walmart a problem- Not aligned
 - Why no parking on street Nov.-April after midnight?
 - Short Left turn lanes, several locations, Lewiston
 - Preemption not possible @ all signals – outdated controllers, Lewiston
 - Left turn on red arrow may need better signage w/arrows; Some reds are so long people get frustrated and go anyway; better flow/coordination, shorter cycle length; morning commute 22 minutes for 1.7 miles from Holly St. to Androscoggin Bank on Park
 - Bike stands – any??? Need more
 - Better identification at bus stops needed; year round pass instead of monthly
 - More central route locations; better transfer points – hub location
 - Cleaner burning fuels – Biodiesel??
 - Get thorough fares up off grid
 - Traffic problems due from Bates Mill development
 - Make downtown truly pedestrian friendly
 - Dedicated “thru” road off grid
 - Local gathering place for community
 - Limited/no handicap parking
 - Better parking enforcement to encourage customer turnover
 - Maybe more meters; get people to utilize garages
- (Auburn Meeting Notes)*
- Another bridge crossing – a new study

- Watch out for diversion to neighbor's houses
- Lisbon St., Spill back onto street

**Lewiston – Auburn CBD Traffic Study
Public Meeting Attendees
June 15, 2005 – Lewiston**

Name	Address	Business/Affiliation
Bruce Hyman	59 Middle St., Portland	WSA
Tom Errico	59 Middle St., Portland	WSA
Don Craig	125 Manley Rd., Auburn	ATRC
Lincoln Loffer	27 Pine St.	COL
Julie Wainer	247 Lisbon St.	The Page Turner
Kimberly Doucette	239 Lisbon St.	Doucette Insurance
Craig Saddlemire	51 S. Wood St.	Visible Community
Paul Boudreau		L.P. W. Director
Vince Lobo		Solo Properties
Travis Soule		Solo Properties
Rhonda Wilson	30 Lisbon St.	Androscoggin Bank
Paul M. Leclair		LFD
Dot Treadwell passes)	106 Bartlett St., Lewiston	Downtown Neighborhoods Ass. (Bus
Tina Bailey	108 Birch St., Lewiston	Empower Lewiston
Nano Zachary	58 Wood, Lewiston	
Sam Fletcher	8 Howe	
David Hediger		City of Lewiston
Gil Arsenault		City of Lewiston
Lucien B. Gosselin	95 Park St., Lewiston	LAEGE
Gregory Mitchell		City of Lewiston
Jennifer Williams		ATRC

**Lewiston - Auburn CBD Traffic Study
Public Meeting Attendees
June 23, 2005 – Auburn**

Name	Address	Business/Affiliation
Don Craig	125 Manley Rd.	ATRC
Tom Errico	59 Middle St., Portland	Wilbur Smith Associates
David Rogers	201 Main St.	Rogers Design Inc.
Paul Niehoff	60 Court St.	City of Auburn Engineering
CJ Manchester	14 Great Falls Plaza	Hilton Garden Inn
Fredrick Pollock	555 Center St.	Gleason Radio
Alyson Stone	77 Horton , Lewiston	Empower Lewiston
Chris Branch	400 Center St.	TSI
Stephen Landry	16 State House Sta., Augusta	Maine DOT
Jennifer Williams	125 Manley Rd.	ATRC
Robert Bell	296 Gracelawn Rd.	City of Auburn
Pat Finnegan	City of Auburn	Auburn City Manager
Bruce Hyman	59 Middle St., Portland	Wilbur Smith Associates

Lewiston – Auburn Downtown CBD Study
Meeting Summary

Meeting: Lewiston Public Meeting – Preliminary Concepts
Date/Time: April 4, 2007, 6:30 PM
Location: Lewiston City Hall

Attendees:

- Ray Faucher, Maine DOT, 16 State House Street, Augusta
- Dave Jones, Department of Public Services, City of Lewiston
- Paul Boudreau, Department of Public Works, City of Lewiston
- David Hediger, Planning and Code, City of Lewiston
- Mark McLomas, Economic Development, City of Lewiston
- Don Craig, Androscoggin Transportation Resource Center
- Tom Errico, Wilbur Smith Associates
- Tim Boesch, Wilbur Smith Associates

The meeting centered on presentations of existing conditions, future conditions, and preliminary concepts. The concepts for Lewiston are outlined in the presentation given, but include specific pedestrian accommodations, signal and turning land modifications, and extensive changes in the 1-way street system in downtown Lewiston.

Some ideas suggested at the meeting follow.

- The effect of one-way to two-way conversion in terms of traffic operations needs to be addressed
- Many one-way locations are due to geometric constraints of the roadways and necessary truck turning radii. An example is the corner of Lisbon Street and Cedar Street which is difficult for trucks and would be worse if made 2-way. Also, at Main Street and Canal Street, the eastbound right turn lane needs to be designed for trucks.
- A truck routing study for the area has been completed however the roads designated as truck routes still need improvements
- Turn Hammond Street by the hospital to 2-way and re-route all southbound traffic from Middle Street and Bates Street to the Hammond/Main/Sabattus Intersection
- Some type of improvement on Bates between Ash Street and Oak Street is possible, but must consider the fire station and bus station. Perhaps the busses can lay-over at another location which is more suitable
- If Cedar Street is made two-way into Canal Street or Lisbon Street, how much less traffic would use Lincoln Street? (i.e. lowering left turn traffic eastbound on Cedar to northbound on Lincoln)
- A roundabout might be considered south of the study area where Canal Street and Lisbon Street meet if Canal is made two-way to this point
- Can Lisbon Street be closed and Park Street be made 2-way to Main Street? (Eliminate Lisbon/Canal signal)

- What are the quickest and easiest ways to get more capacity downtown without changing the whole 1-way system flow?
- Nobody seems to use the second (left side) left turn bay northbound at Lincoln Street and Main Street. Is the lane laid out right? Are people already thinking about making a right turn at Great Falls, Turner, or avoiding those making left turns off Court Street?
- Signage at Minot Avenue, Court Street, and Union Street Bypass (Auburn) needs to be improved to include overhead lane designation signage. It's very difficult to get out of the lanes once you get in the wrong one during peak periods.
- Perhaps extending the eastbound right turn lane at Main Street and Canal Street (back over the bridge) would help right turn traffic get through instead of being blocked by through traffic backing up at the Canal/Lisbon signal.

Lewiston – Auburn Downtown CBD Study
Meeting Summary

Meeting: Auburn Public Meeting – Preliminary Concepts
Date/Time: April 5, 2007, 6:30 PM
Location: Auburn Hall, Auburn, Maine

Attendees:

- Ray Faucher, Maine DOT, 16 State House Station, Augusta
- Jeremiah Bartlett, Traffic Engineer, Here as resident
- Sabine Bartlett, Resident
- Jennifer Williams, Traffic Engineer, Here as resident
- Eric LaBelle, City of Auburn
- Steve Landry, Maine DOT, 16 State House Station, Augusta
- Maureen Aube, 748 Hotel Rd., also City of Auburn
- Bob Belz, City of Auburn
- Laurie Smith, City of Auburn
- John Jenkins, City of Auburn
- Don Craig, Androscoggin Transportation Research Center
- Tom Errico, Wilbur Smith Associates
- Tim Boesch, Wilbur Smith Associates

The meeting centered on presentations of existing conditions, future conditions, and preliminary concepts. The concepts for Auburn are outlined in the presentation given, but include specific pedestrian accommodations and signal and turning lane modifications.

Some of the comments, questions, and answers expressed at the meeting follow.

- What are the pedestrian accommodations in the recommendations?
 - Tighten curves (Court and Great Falls Plaza, Court and Turner)
 - Pedestrian signals
 - Pedestrian refuge at Court & Turner, north leg crosswalk
- Can we push westbound Court north at Turner in the park area and add a pedestrian refuge?
 - You need at least 6 feet for the median width and it would be hard to bow the road out that far and still meet the northwest corner of Court and Turner where the court building is.
- Can we remove the Court Street westbound right to Great Falls and have this traffic turn right at Turner?
 - Would definitely need the additional lane for a westbound right from Court to Turner, but may work well
- People are more concerned about pedestrian circulation and safety than moving cars downtown.
- There is disappointment with not having more pedestrian recommendations from the study.
- How can we keep through traffic from downtown and encourage pedestrians?
- Getting more housing (condos) downtown would help bring more pedestrians.

- Would Turner have to widen back to 2 or 3 lanes at Hampshire if it is only 1 lane northbound from Court?
 - Yes
- A 2-lane roundabout is just crazy. Do they work? Do they accommodate trucks?
 - Yes
- What about a single lane Court Street? Can you force through traffic to new bridge or to other streets through downtown congestion?
 - A possibility, but really not part of this analysis
- Crossing Court from Great Falls to south side by Town Hall is very hard for pedestrians.
 - It needs signal work, better crosswalks, and/or speed tables.
 - Is there something obvious which can be done there?
 - Can we slow traffic on the bridge heading westbound somehow?
 - Why not widen cross walk at Court Street and Great Falls Plaza/ Main Street to make it more visible
 - Add textured crosswalks to make them more visible
 - What about overhead signs to signal crosswalk / gateway to Auburn?
 - Narrow the road coming from bridge
 - Add textured pavement for whole intersection? (i.e. Duratherm)
 - How well are the pedestrian phases working?
 - Is street lighting OK? - it appears to be fine.
 - During certain hours, can you make the pedestrian phase happen at each cycle?
 - Yes, but can cause more congestion headaches
- Can we have countdown pedestrian heads?
 - Possibly.
- Develop pedestrian trails along river and other parks

